EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

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"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

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"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

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"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

I agree to the terms and conditions.

EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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93. Generate a Unique List out of Duplicate Entries 38

1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

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"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

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"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

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"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
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RAWATBHATA

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"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
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SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

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"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

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"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

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"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

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"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

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"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

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"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

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RGARH (483254), KOTDA, BADODI

YA
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RAWATBHATA

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rh

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"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

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"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

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"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

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"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

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RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

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rh

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"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

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"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

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"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

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I agree to the terms and conditions.

EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers 1
2. SUM of Digits when cell Contains Numbers and non Numbers both 1
3. A List is Unique or Not (Whether it has duplicates) 1
4. Count No. of Unique Values 1
5. Count No. of Unique Values Conditionally 1
6. Add Month to or Subtract Month from a Given Date 2
7. Add Year to or Subtract Year from a Given Date 2
8. Convert a Number to a Month Name 3
9. Converting Date to a Calendar Quarter 3
10. Converting Date to a Indian Financial Year Quarter 3
11. Calculate Age from Given Birthday 4
12. Number to Date Format Conversion 4
13. Number to Time Format Conversion 4
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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

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"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

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ALSINGPURA

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"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

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rh

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"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

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"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

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ALSINGPURA

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RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

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"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

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"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

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"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

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I agree to the terms and conditions.

EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers 1
2. SUM of Digits when cell Contains Numbers and non Numbers both 1
3. A List is Unique or Not (Whether it has duplicates) 1
4. Count No. of Unique Values 1
5. Count No. of Unique Values Conditionally 1
6. Add Month to or Subtract Month from a Given Date 2
7. Add Year to or Subtract Year from a Given Date 2
8. Convert a Number to a Month Name 3
9. Converting Date to a Calendar Quarter 3
10. Converting Date to a Indian Financial Year Quarter 3
11. Calculate Age from Given Birthday 4
12. Number to Date Format Conversion 4
13. Number to Time Format Conversion 4
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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

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"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

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ALSINGPURA

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"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

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rh

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"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

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"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

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ALSINGPURA

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RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

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"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

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"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

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"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

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I agree to the terms and conditions.

EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers 1
2. SUM of Digits when cell Contains Numbers and non Numbers both 1
3. A List is Unique or Not (Whether it has duplicates) 1
4. Count No. of Unique Values 1
5. Count No. of Unique Values Conditionally 1
6. Add Month to or Subtract Month from a Given Date 2
7. Add Year to or Subtract Year from a Given Date 2
8. Convert a Number to a Month Name 3
9. Converting Date to a Calendar Quarter 3
10. Converting Date to a Indian Financial Year Quarter 3
11. Calculate Age from Given Birthday 4
12. Number to Date Format Conversion 4
13. Number to Time Format Conversion 4
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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

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"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

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ALSINGPURA

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"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

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rh

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"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

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"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

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ALSINGPURA

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RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

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"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

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"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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EXCEL Formulas Bible

Excel 2013 / 2016

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1. SUM of Digits when cell Contains all Numbers

If you cell contains only numbers like A1:= 7654045, then following formula can be used to find sum of digits

=SUMPRODUCT(--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))

2. SUM of Digits when cell Contains Numbers and non Numbers both

If you cell contains non numbers apart from numbers like A1:= 76$5a4b045%d, then following formula can be used to find sum of digits

=SUMPRODUCT((LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:9),"")))*ROW(1:9))

The above formula can be used even if contains all numbers as well.

3. A List is Unique or Not (Whether it has duplicates)

Assuming, your list is in A1 to A1000. Use following formula to know if list is unique.

=MAX(FREQUENCY(A1:A1000,A1:A1000))

=MAX(INDEX(COUNTIF(A1:A1000,A1:A1000),,))

If answer is 1, then it is Unique. If answer is more than 1, it is not unique.

4. Count No. of Unique Values

Use following formula to count no. of unique values -

=SUMPRODUCT((A1:A100<>"")/COUNTIF(A1:A100,A1:A100&""))

5. Count No. of Unique Values Conditionally

If you have data like below and you want to find the unique count for Region = “A”, then you can use below **Array** formula –

=SUM(IF(FREQUENCY(IF(A2:A20<>"",IF(A2:A20="A",MATCH(B2:B20,B2:B20,0))),ROW(A2:A20)-ROW(A2)+1),1))

If you have more number of conditions, the same can be built after A2:A20 = “A”.

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	A	b
5	A	b
6	A	b
7	A	c
8	A	c
9	A	a
10	B	m
11	B	n
12	B	o
13	B	p
14	B	d
15	B	d
16	B	e
17	B	e

6. Add Month to or Subtract Month from a Given Date

Very often, you will have business problems where you have to add or subtract month from a given date. One scenario is calculation for EMI Date.

Say, you have a date of 10/22/14 (MM/DD/YY) in A1 and you want to add number of months which is contained in Cell B1.

The formula in this case would be

=EDATE(A1,B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)+B1,DAY(A1))]

Now, you want to subtract month which is contained in Cell B1.

=EDATE(A1,-B1)

[Secondary formula =DATE(YEAR(A1),MONTH(A1)-B1,DAY(A1))]

7. Add Year to or Subtract Year from a Given Date

In many business problems, you might encounter situations where you will need to add or subtract years from a given date.

Let's say A1 contains Date and B1 contains numbers of years.

If you want to add Years to a given date, formulas would be -

=EDATE(A1,12*B1)

=DATE(YEAR(A1)+B1,MONTH(A1),DAY(A1))

If you want to subtract Years from a given date, formulas would be -

=EDATE(A1,-12*B1)

=DATE(YEAR(A1)-B1,MONTH(A1),DAY(A1))

8. Convert a Number to a Month Name

Use below formula to generate named 3 lettered month like Jan, Feb....Dec

=TEXT(A1*30,"mmm")

Replace "mmm" with "mmmm" to generate full name of the month like January, February....December in any of the formulas in this post.

9. Converting Date to a Calendar Quarter

Assuming date is in Cell A1. You want to convert it into a quarter (1, 2, 3 & 4). Jan to Mar is 1, Apr to Jun is 2, Jul to Sep is 3 and Oct to Dec is 4.

=CEILING(MONTH(A1)/3,1)

OR

= ROUNDUP(MONTH(A1)/3,0)

OR

=CHOOSE(MONTH(A1),1,1,1,2,2,2,3,3,3, 4,4,4)

10. Converting Date to a Indian Financial Year Quarter

Assuming date is in Cell A1. You want to convert it into a Indian Financial Year Quarter. Jan to Mar is 4, Apr to Jun is 1, Jul to Sep is 2 and Oct to Dec is 3.

=CEILING(MONTH(A1)/3,1)+IF(MONTH(A1)<=3,3,-1)

OR

=ROUNDUP(MONTH(A1)/3,0)+IF(MONTH(A1)<=3,3,-1)

OR

=CHOOSE(MONTH(A1),4,4,4,1,1,1,2,2,2,3,3,3)

11. Calculate Age from Given Birthday

=DATEDIF(A1,TODAY(),"y")&" Years "&DATEDIF(A1,TODAY(),"ym")&" Months "&DATEDIF(A1,TODAY(),"md")&" Days"

12. Number to Date Format Conversion

If you have numbers like 010216 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/00") for 2 digits year

Note – Minimum 5 digits are needed for above formula to work

If you have numbers like 01022016 and you want to convert this to date format, then the following formula can be used

=--TEXT(A1,"00\/00\/0000") for 4 digits year

Note – Minimum 7 digits are needed for above formula to work

13. Number to Time Format Conversion

If you have numbers like 1215 and you want to convert this to hh:mm format, then the following formula can be used

=--TEXT(A1,"00\:00")

Note – Minimum 3 digits are needed for above formula to work

To convert to hh:mm:ss format

=--TEXT(A1,"00\:00\:00")

Note – Minimum 5 digits are needed for above formula to work

14. Count Cells Starting (or Ending) with a particular String

1. Say you want to count all cells starting with C

=COUNTIF(A1:A10,"c*")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"excel*")

2. For ending

=COUNTIF(A1:A10,"*c")

c* is case insensitive. Hence, it will count cells starting with both c or C.

Suppose you want to find all cells starting with Excel.

=COUNTIF(A1:A10,"*excel")

15. Count No. of Cells Having Numbers Only

COUNT function counts only those cells which are having numbers.

Assuming your range is A1:A10, use following formula

=COUNT(A1:A10)

16. Count No. of Cells which are containing only Characters

Hence, if your cell is having a number 2.23, it will not be counted as it is a number.

Use below formula considering your range is A1:A10

=COUNTIF(A1:A10,"*")

17. Number of Characters in a String without considering blanks

Say, you have a string like Vijay A. Verma and I need to know how many characters it has. In this case, it has 12 including decimal and leaving blanks aside.

Use below formula for the same -

=LEN(SUBSTITUTE(A1," ",""))

18. Number of times a character appears in a string

Suppose you want to count the number of times, character “a” appears in a string

=LEN(A1)-LEN(SUBSTITUTE(LOWER(A1),"a",""))

19. Count Non Numbers in a String

Suppose you have a string "abc123def45cd" and you want to count non numbers in this.

If your string is in A1, use following formula in A1

=IF(LEN(TRIM(A1))=0,0,SUMPRODUCT(--NOT(ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))))

20. Count Numbers in a String

Suppose you have a string "abc123def43cd" and you want to count numbers in this.

If your string is in A1, use following formula -

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(A1,ROW(1:10)-1,"")))

OR

=SUMPRODUCT(--ISNUMBER((--MID(A1,ROW(INDIRECT("1:"&LEN(A1))),1))))

21. Count only Alphabets in a String

Suppose you have a string "Ab?gh123def%h*" and you want to count only Aphabets.

Suppose your string is in A1, put following formula for this.

=SUMPRODUCT(LEN(A1)-LEN(SUBSTITUTE(UPPER(A1),CHAR(ROW(INDIRECT("65:90"))),"")))

OR

=SUMPRODUCT(--(ABS(77.5-CODE(MID(UPPER(A1),ROW(INDIRECT("A1:A"&LEN(A1))),1)))<13))

22. Most Frequently Occurring Value in a Range

Assuming, your range is A1:A10, enter the below formula as Array Formula i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=INDEX(A1:A10,MATCH(MAX(COUNTIF(A1:A10,A1:A10)),COUNTIF(A1:A10,A1:A10),0))

The non-Array version of above formula

=INDEX(A1:A10,MATCH(MAX(INDEX(COUNTIF(A1:A10,A1:A10),,)),INDEX(COUNTIF(A1:A10,A1:A10),,),0))

23. COUNTIF on Filtered List

You can use SUBTOTAL to perform COUNT on a filtered list but COUNTIF can not be done on a filtered list. Below formula can be used to perform COUNTIF on a filtered list

=SUMPRODUCT(SUBTOTAL(3,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in COUNTIF (=COUNTIF(B2:B20,">14"))

24. SUMIF on Filtered List

You can use SUBTOTAL to perform SUM on a filtered list but SUMIF can not be done on a filtered list. Below formula can be used to perform SUMIF on a filtered list

=SUMPRODUCT(SUBTOTAL(9,OFFSET(B2,ROW(B2:B20)-ROW(B2),))*(B2:B20>14))

Here B2:B20>14 is like a criterion in SUMIF.

25. Extract First Name from Full Name

=LEFT(A1,FIND(" ",A1&" ")-1)

26. Extract Last Name from Full Name

=TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1)))

27. Extract the Initial of Middle Name

Suppose, you have a name John Doe Smith and you want to show D as middle initial. Assuming, your data is in A1, you may use following formula

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,1),"")

If name is of 2 or 1 words, the result will be blank. This works on 3 words name only as middle can be decided only for 3 words name.

28. Extract Middle Name from Full Name

=IF(COUNTIF(A1,"* * *"),MID(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-(FIND(" ",A1)+1)),"")

=IF(COUNTIF(A1,"* * *"),TRIM(MID(SUBSTITUTE(A1," ",REPT(" ",LEN(A1)),2),FIND(" ",A1)+1,LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),LEFT(REPLACE(A1,1,FIND(" ",A1),""),FIND(" ",REPLACE(A1,1,FIND(" ",A1),""))-1))

29. Remove Middle Name in Full Name

=IF(COUNTIF(A1,"* * *"),LEFT(A1,FIND(" ",A1&" "))&TRIM(RIGHT(SUBSTITUTE(A1," ",REPT(" ",LEN(A1))),LEN(A1))),"")

=IF(COUNTIF(A1,"* * *"),REPLACE(A1,FIND(" ",A1)+1,FIND(" ",A1,FIND(" ",A1)+1)-FIND(" ",A1),""),"")

30. Extract Integer and Decimal Portion of a Number

To extract Integer portion, one of the below can be used -

=INT(A1)

=TRUNC(A1)

Positive value in A1 - If A1 contains 84.65, then answer would be 84.
Negative value in A1 - If A1 contains -24.39, then answer would be -24.
If you want only +ve value whether value in A1 is -ve or +ve, the formula can have many variants.

=INT(A1)*SIGN(A1) OR =TRUNC(A1)*SIGN(A1)

=INT(ABS(A1)) OR =TRUNC(ABS(A1))

=ABS(INT(A1)) OR = ABS(TRUNC(A1))

To extract Decimal portion -

=MOD(ABS(A1),1)

=ABS(A1)-INT(ABS(A1))

Positive value in A1 - If A1 contains 84.65, then answer would be 0.65.
Negative value in A1 - If A1 contains -24.39, then answer would be 0.39.

31. First Day of the Month for a Given Date

Suppose you have been given a date say 10/22/14 (MM/DD/YY) and you want to calculate the first day of the Current Month. Hence, you want to achieve a result of 10/1/2014 (MM/DD/YY).

The formulas to be used -

=DATE(YEAR(A1),MONTH(A1),1)

=A1-DAY(A1)+1

=EOMONTH(A1,-1)+1

32. How Many Mondays or any other Day of the Week between 2 Dates

Suppose A1 = 23-Jan-16 and A2 = 10-Nov-16. To find number of Mondays between these two dates

=SUMPRODUCT(--(TEXT(ROW(INDIRECT(A1&":"&A2)),"ddd")="Mon"))

"Mon" can be replaced with any other day of the week as per need.

33. Maximum Times a Particular Entry Appears Consecutively

Suppose, we want to count maximum times "A" appears consecutively, you may use following **Array** formula -

=MAX(FREQUENCY(IF(A2:A20="A",ROW(A2:A20)),IF(A2:A20<>"A",ROW(A2:A20))))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

	A	B
1	**Region**	**Sales Man**
2	A	a
3	A	a
4	g	b
5	g	b
6	g	b
7	g	c
8	A	c
9	A	a
10	B	m
11	B	n
12	A	o
13	A	p
14	A	d
15	B	d
16	B	e
17	B	e

34. Find the Next Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the next Monday, I can get either 2-Jan-17 or 9-Jan-17 as per need. For Tuesday to Sunday, it is not a problem as they come after 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, next Monday would be 2-Jan-17 only)

Next Mon	=CEILING($A$1-2,7)+2
Next Tue	=CEILING($A$1-3,7)+3
Next Wed	=CEILING($A$1-4,7)+4

Next Thu	=CEILING($A$1-5,7)+5
Next Fri	=CEILING($A$1-6,7)+6
Next Sat	=CEILING($A$1-7,7)+7
Next Sun	=CEILING($A$1-8,7)+8

Case 2 - If the Day falls on the same date, then next date (Hence, in case of 2-Jan-17, next Monday would be 9-Jan-17 only)

Next Mon	=CEILING($A$1-1,7)+2
Next Tue	=CEILING($A$1-2,7)+3
Next Wed	=CEILING($A$1-3,7)+4
Next Thu	=CEILING($A$1-4,7)+5
Next Fri	=CEILING($A$1-5,7)+6
Next Sat	=CEILING($A$1-6,7)+7
Next Sun	=CEILING($A$1-7,7)+8

35. Find the Previous Week of the Day

There are 2 scenarios in this case. For example, if today's date is 2-Jan-17 (Monday) and I try to find the previous Monday, I can get either 2-Jan-17 or 26-Dec-16 as per need. For Tuesday to Sunday, it is not a problem as they come prior to 2-Jan-17 only.

Case 1 - If the Day falls on the same date, then that very date (Hence, in case of 2-Jan-17, previous Monday would be 2-Jan-17 only)

Previous Mon	=CEILING($A$1-8,7)+2
Previous Tue	=CEILING($A$1-9,7)+3
Previous Wed	=CEILING($A$1-10,7)+4
Previous Thu	=CEILING($A$1-11,7)+5
Previous Fri	=CEILING($A$1-12,7)+6
Previous Sat	=CEILING($A$1-13,7)+7
Previous Sun	=CEILING($A$1-14,7)+8

Case 2 - If the Day falls on the same date, then previous date (Hence, in case of 2-Jan-17, previous Monday would be 26-Dec-16 only)

Previous Mon	=CEILING($A$1-9,7)+2
Previous Tue	=CEILING($A$1-10,7)+3
Previous Wed	=CEILING($A$1-11,7)+4
Previous Thu	=CEILING($A$1-12,7)+5
Previous Fri	=CEILING($A$1-13,7)+6
Previous Sat	=CEILING($A$1-14,7)+7
Previous Sun	=CEILING($A$1-15,7)+8

36. Get File Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=CELL("filename",$A$1)

37. Get Workbook Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

=REPLACE(LEFT(CELL("filename",$A$1),FIND("]",CELL("filename",$A$1))-1),1,FIND("[",CELL("filename",$A$1)),"")

38. Get Sheet Name through Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

Use following formula -

=REPLACE(CELL("filename",A1),1,FIND("]",CELL("filename",A1)),"")

Make sure that A1 is used in the formula. If it is not used, it will extract sheet name for the last active sheet which may not be one which we want.

If you want the sheet name for last active sheet only, then formula would become =REPLACE(CELL("filename"),1,FIND("]",CELL("filename")),"")

39. Get Workbook's Directory from Formula

Before getting this, make sure that you file has been saved at least once as this formula is dependent upon the file path name which can be pulled out by CELL function only if file has been saved at least once.

If your workbook is located in say C:\Excel\MyDocs, the formula to retrieve the directory for this would be

=LEFT(CELL("filename",A1),FIND("[",CELL("filename",A1))-2)

40. Last Day of the Month for a Given Date

Suppose, you are given a date say 10/22/14 (MM/DD/YY) and we want to have the last date of the month for the given date. Hence, you needs an answer of 10/31/14. The formulas to be used in this case -

=EOMONTH(A1,0)

=DATE(YEAR(A1),MONTH(A1)+1,0)

=DATE(YEAR(A1),MONTH(A1)+1,1)-1

41. Perform Multi Column VLOOKUP

You know VLOOKUP, one of the most loved function of Excel. The syntax is VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Here look_value can be a single value not multiple values.

Now, you are having a situation where you want to do vlookup with more than 1 values. For the purpose of illustrating the concept, let's say we have 2 values to be looked up.

Below is your lookup table and you want to look up for Emp - H and Gender - F for Age.

	A	B	C
1	Emp	Gender	Age
2	A	M	37
3	A	F	35
4	C	F	39
5	D	F	40
6	E	M	37
7	E	M	39
8	G	M	34
9	H	F	25
10	H	M	35
11	K	F	35
12	K	M	38

=INDEX(C2:C12,MATCH(1,INDEX(--((A2:A12=F2)*(B2:B12=G2)*(ROW(A2:A12)-ROW(A2)+1)<>0),,),0))

Concatenation Approach

=INDEX(C2:C10,MATCH(F2&"@@@"&G2,INDEX(A2:A10&"@@@"&B2:B10,,),0))
@@@ can be replaced by any characters which should not be part of those columns.

By concatenation, you can have as many columns as possible.

CAUTION - Result of entire concatenation should not be having length more than 255. Hence, F2&"@@@"&G2 should not have more than 255 characters.

Another alternative is to use below Array formula -

=INDEX(C2:C12,MATCH(1,--NOT(ISLOGICAL(IF(A2:A12=F2,IF(B2:B12=G2,C2:C12)))),0))

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

42. VLOOKUP from Right to Left

VLOOKUP always looks up from Left to Right. Hence, in the below table, I can find Date of Birth of Naomi by giving following formula –

=VLOOKUP("Naomi",B:D,3,0)

	A	B	C	D	E	F	G	H	I
1	Emp ID	First Name	Gender	Date of Birth	Date of Joini	Salary	State	Zip	Region
2	250945	Terisa	F	5/23/1984	12/11/2009	64667	VA	22651	South
3	778777	Milton	M	10/10/1986	1/6/2014	46688	TX	78344	South
4	962153	Lonnie	F	1/13/1972	7/23/2009	78661	MN	56088	Midwest
5	833630	Naomi	F	11/25/1961	2/27/1990	118632	AR	71855	South
6	565499	Cathryn	F	8/13/1979	11/30/2009	181053	WA	99349	West
7	608769	Sylvester	M	5/24/1969	6/28/1999	76790	LA	71418	South
8	262325	Jamaal	M	3/16/1968	8/30/1999	170583	IN	46866	Midwest
9	562671	Leslie	F	8/8/1975	7/14/2007	136188	MN	56178	Midwest
10	711925	Gaynell	F	7/30/1990	1/20/2013	88425	MD	20724	South
11	613284	Loria	F	7/29/1992	5/20/2015	194557	OH	44282	Midwest
12	917399	Florance	F	3/31/1965	7/18/1986	177637	CA	94307	West
13	369366	Mathew	M	6/11/1993	8/16/2015	193972	MS	39113	South
14	642751	Scottie	M	12/24/1966	9/3/2015	198240	MO	63876	Midwest
15	323627	Timmy	M	5/19/1993	9/21/2014	175621	NM	87413	West
16	833463	Warren	M	5/13/1981	8/30/2011	142919	CA	95667	West
17	146564	Delta	F	6/19/1984	10/10/2011	132695	WV	25685	South
18	290540	Hal	M	12/5/1980	3/21/2009	118357	IA	51201	Midwest
19	219886	Alberto	M	3/16/1958	3/6/1992	126401	VA	23054	South

But, If I have to find Emp ID corresponding to Naomi, I can not do it through VLOOKUP formula. To perform VLOOKUP from Right to Left, you will have to use INDEX / MATCH combination. Hence, you will have to use following formula –

=INDEX(A:A,MATCH("Naomi",B:B,0))

43. Case Sensitive VLOOKUP

Suppose your have data like below table and you want to do a case sensitive VLOOKUP

	A	B
1	Name	Salary
2	Lisa	3500
3	Mira	2300
4	Sara	4300
5	SARA	3200
6	Sarah	4500

If perform a regular VLOOKUP on SARA, I would get the answer 4300. But in a case sensitive VLOOKUP, answer should be 3200. You may use below formula for Case Sensitive VLOOKUP -

=INDEX(B2:B10,MATCH(TRUE,INDEX(EXACT("SARA",A2:A10),,),FALSE))

44. Rank within the Groups

Suppose your have data like below table and you want to know rank of students.

Student	School	Marks	Rank
Student 1	School 1	92	
Student 2	School 2	64	
Student 3	School 3	73	
Student 4	School 4	72	
Student 5	School 5	46	
Student 6	School 6	70	
Student 7	School 7	55	
Student 8	School 8	21	
Student 9	School 9	91	
Student 10	School 10	27	
Student 11	School 1	91	
Student 12	School 2	84	
Student 13	School 3	40	
Student 14	School 4	70	
Student 15	School 5	51	
Student 16	School 6	37	
Student 17	School 7	53	
Student 18	School 8	54	
Student 19	School 9	53	
Store_20	School 10	59	

You will simple put following formula in D2

=RANK(C2,C2:C100)

But what if you are asked to produce rank of students within each school. Hence, every school's rank will start with 1..

Put following formula in D2 for that case for Descending order ranking. (For ascending order, replace ">" with "<" without quote marks)

=SUMPRODUCT((B$2:B$100=B2)*(C$2:C$100>C2))+1

OR

=COUNTIFS(B$2:B$100,B2,C$2:C$100,">"&C2)+1

45. Remove Alphabets from a String

If your string is in cell A1, use following formula to remove all alphabets from a string

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(LOWER(A1),"a",""),"b",""),"c",""),"d",""),"e",""),"f",""),
"g",""),"h",""),"i",""),"j",""),"k",""),"l",""),"m",""),"n",""),"o",""),
"p",""),"q",""),"r",""),"s",""),"t",""),"u",""),"v",""),"w",""),"x",""),"y",""),"z","")
```

46. Remove numbers from string

To remove numbers from a string (for example Vij1aY A. V4er7ma8 contains numbers which are not required), we can use nested SUBSTITUTE function to remove numbers. Use below formula assuming string is in A1 cell -

```
=SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(SUBSTITUTE(
A1,1,""),2,""),3,""),4,""),5,""),6,""),7,""),8,""),9,""),0,"")
```

Note - Since this formula is in multiple lines, hence you will have to copy this in Formula Bar. If you copy this formula in a cell, it will copy this in three rows.

47. Roman Representation of Numbers

Use ROMAN function.

Hence ROMAN(56) will give LVI.

ROMAN works only for numbers 1 to 3999.

48. Sum Bottom N Values in a Range

Suppose you have numbers in range A1:A100 and you want to sum up bottom N values

```
=SUMPRODUCT(SMALL($A$1:$A$100,ROW(1:10)))
```

In case, you want to ignore 0 values (and blanks)

```
=SUMPRODUCT(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)))
```

Both the above formulas will function only if there are at least N values as per ROW(1:N). Hence, for above formulas, it would work only if there are at least 10 numbers in A1 to A100.

To overcome this limitation -

Enter the below formulas as Array Formula

```
=SUM(IFERROR(SMALL($A$1:$A$100,ROW(1:10)),0))
```

=SUM(IFERROR(SMALL(IF($A$1:$A$100<>0,$A$1:$A$100),ROW(1:10)),0))

Non Array Versions of above formulas (For Excel 2010 and above)

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100,ROW(1:10)))

=SUMPRODUCT(AGGREGATE(15,6,$A$1:$A$100/($A$1:$A$100<>0),ROW(1:10)))

49. Sum Every Nth Row

If your numbers are in range A1:A100, use below formula

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,2)=0))

Above formula is for every 2nd row. Replace 2 with N. Hence, for every 5th row -

=SUMPRODUCT((A1:A100)*(MOD(ROW(A1:A100)-ROW(A1)+1,5)=0))

This is a generic formula and will work for any range. If you range is B7:B50, your formula would become

=SUMPRODUCT((B7:B50)*(MOD(ROW(B7:B50)-ROW(B7)+1,2)=0))

50. We have AVERAGEIF. What about MEDIANIF and MODEIF?

Excel doesn't provide MEDIANIF and MODEIF. You will have to use Array formulas to achieve these functionality. Let's assume that our data is like below –

	A	B	C
1	**Gender**	**Income**	
2	M	40000	
3	F	70000	
4	M	10000	
5	F	70000	
6	M	50000	
7	F	40000	
8	M	10000	
9	F	30000	
10	M	80000	
11	F	80000	
12	M	60000	
13	F	50000	
14			
15			
16	Median	45000	{=MEDIAN(IF(A2:A13="M",B2:B13))}
17	Mode	10000	{=MODE(IF(A2:A13="M",B2:B13))}

To calculate MEDIANIF and MODEIF, enter below formulas i.e. not by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

=MEDIAN(IF(A2:A13="M",B2:B13))

=MODE(IF(A2:A13="M",B2:B13))

Non-Array alternatives

For MEDIANIF

=AGGREGATE(16,6,(B1:B13)/(A1:A13="m"),50%)

For MODEIF

=INDEX(B1:B20,MATCH(MAX(INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,)),INDEX((COUNTIF(B1:B20,B1:B20)*(A1:A20="m")),,),0))

51. Number of Days in a Month

Suppose, you have been given a date say 15-Nov-14 and you have to determine how many days this particular month contains.

The formula which you need to use in the above case would be

=DAY(EOMONTH(A1,0))

Explanation - EOMONTH(A1,0) gives the last date of the month and DAY function extract that particular Day from the last date of the month.

52. How to Know if a Year is a Leap Year

Let's say that A1 contains the year. To know whether it is a Leap Year or not, use following formula -

=MONTH(DATE(A1,2,29))=2

TRUE means that it is Leap Year and FALSE means that this is not a Leap Year.

53. Last Working Day of the Month If a Date is Given

If A1 holds a date, the formula for calculating last Working Day of the month would be

=WORKDAY(EOMONTH(A1,0)+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,0)+1,-1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,0)+1,-1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

54. First Working Day of the Month if a Date is Given

If A1 contains a date, then formula for First Working Day of the month would be

=WORKDAY(EOMONTH(A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.

But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH(A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH(A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

55. Date for Nth Day of the Year

Suppose A1 contains the Year and you are asked to find 69th day of the year which is contained in A2. Then formula for finding Nth day of the year would be

=DATE(A1,1,1)+A2-1

56. Calculate Geometric Mean by Ignoring 0 and Negative Values

Geometric Mean is a useful mean and is applied only for +ve values. Hence, you will need to ignore <=0 values while calculating Geometric Mean. It is generally used where %ages are involved. For example, population growth for first year is 30%, for second year is 25% and for third year, it is 15%. Then Geometric Mean is used to calculate not Arithmetic Mean.

Generally, Geometric Mean is calculated by the formula =GEOMEAN(A1:A10)

It would give error if the range contains <=0 values. There are various ways to deal with it and most commonly used way is to ignore <=0 values while calculating Geometric Mean.
To ignore <=0 values, you must use an Array formula i.e. which must be entered by pressing CTRL+SHIFT+ENTER.

=GEOMEAN(IF(A1:A10>0,A1:A10))

The above formula takes into account only those values which are positive.

Bonus Tip - When %age growth are involved, you will need to use following ARRAY formula to calculate Geometric Mean -

=GEOMEAN(IF(A1:A10>0,(1+A1:A10)))-1

Don't forget to format your result as %age.

57. Financial Function - Calculate EMI

You want to take a loan and you want to calculate EMI OR you want to build an EMI calculator in Excel. It is a fairly easy job to do -

You will need to use PMT function for this. It has following structure -

PMT(rate, nper, pv, [fv], [type])

rate: You rate of interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you

will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)
type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)
Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PMT(B1/12,B2,-B3,B4,B5)

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PMT(B1/12,B2,B3,B4,B5))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/EMI-Calculator1.xlsx

	A	B	C	D	E	F	G
1	Interest Rate	12%					
2	No. of Payments	36					
3	Loan Amount	10000					
4	Future Value	0					
5	EMI Due Type	0					
6							
7	EMI	$332.14					

0 - At the end of the Period
1 - At the beginning of the period

58. Financial Function - Calculate Interest Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI.

Excel defines IPMT as "Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate"

The syntax of IPMT is IPMT(rate, per, nper, pv, [fv], [type]).
‘

rate: You rate of interest

per: Period for which you want to calculate Interest

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve IPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, IPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, IPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =IPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Interest will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry interest for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(IPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Interest-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Interest
2	Period for which Interest is wanted	24						1	$100.00
3	No. of Payments	36						2	$97.68
4	Loan Amount	10000						3	$95.33
5	Future Value	0						4	$92.97
6	EMI Due Type	0						5	$90.57
7								6	$88.16
8	Interest	$40.30						7	$85.72
9								8	$83.25
10								9	$80.77
11								10	$78.25
12								11	$75.71
13								12	$73.15
14								13	$70.56
15								14	$67.94
16								15	$65.30
17								16	$62.63
18								17	$59.94
19								18	$57.21
20								19	$54.47
21								20	$51.69

0 - At the end of the Period
1 - At the beginning of the period

59. Financial Function - Calculate Principal Part of an EMI

Now the EMI for a month = Interest for that month and Principal for that month. IPMT is used to calculate the interest portion of your EMI. To calculate the principal part of an EMI, you will need to use PPMT.

Excel defines PPMT as "Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate."

The syntax of PPMT is PPMT(rate, per, nper, pv, [fv], [type])

rate: You rate of interest

per: Period for which you want to calculate Principal

nper: No. of payments. Your nper and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put negative value of this in your formula. If you don't put negative value, your EMI would be in negative but answer would be same though with negative sign.

+ve / -ve PPMT requires some explanation though you may choose to ignore. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PPMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PPMT is +ve.

Now what is +ve or -ve is simply your preference. I recommend you should not worry about this.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =PPMT(B1/12,B2,B3,-B4,B5,B6)

Also, since Principal will vary every month, hence it makes sense to calculate it for each month. Columns H & I carry Principal for each month.

Bonus Tip = If you use ABS function, then there would be no need to put negative value of PV. Hence, formula in this case would be =ABS(PPMT(B1/12,B2,B3,B4,B5,B6))

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/Principal-Payment-Calculator.xlsx

	A	B	C	D	E	F	G	H	I
1	Interest Rate	12%						Period	Principal
2	Period for which Principal is wanted	24						1	$232.14
3	No. of Payments	36						2	$234.46
4	Loan Amount	10000						3	$236.81
5	Future Value	0						4	$239.18
6	EMI Due Type	0						5	$241.57
7								6	$243.98
8	Principal	$291.84						7	$246.42
9								8	$248.89
10								9	$251.38
11								10	$253.89
12								11	$256.43
13								12	$258.99
14								13	$261.58
15								14	$264.20
16								15	$266.84
17								16	$269.51
18								17	$272.21
19								18	$274.93
20								19	$277.68
21								20	$280.45

0 - At the end of the Period
1 - At the beginning of the period

60. Financial Function - Calculate Number of EMIs to Pay Up a Loan

You have taken a loan and you know your EMI capability. So, you want to know how many months will be taken to pay off a loan completely.

It is fairly easy job to do it in Excel. You will need to use NPER function for this.

Excel defines NPER as "Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate."

Syntax of NPER is NPER(rate,pmt,pv,[fv],[type]).

rate: You rate of interest

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the rate in your formula should be monthly only. Generally, interest rate is specified yearly i.e. 10.5% per year. This you should divide by 12 to arrive at monthly rate. Hence, if you wanted 3 years loan, it means nper would 3x12=36 months.
If it is quarterly, rate = 10.5%/4 = 2.625% and nper would be 3x4 = 12
If it is annual, rate = 10.5% and nper = 3

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will

have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

Also note, fv and type are optional and may not be required in your formula.

The formula used in the below picture is =NPER(B1/12,-B2,B3)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/NPER-Calculator.xlsx

	A	B
1	Interest Rate	12%
2	EMI Per Month	332.14
3	Loan Amount	10000
4	Future Value	0
5	EMI Due Type	0
6		
7	Payment Periods	36.00
8		
9		

0 - At the end of the Period
1 - At the beginning of the period

61. Financial Function - Calculate Interest Rate

You want to take a loan. You know how much loan to take (pmt), you know how many months you want to pay up (nper) and you want to know effective rate of interest.
Excel makes it easy to do. RATE function is the answer for this.

Excel defines RATE as "Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value."
Syntax of RATE is RATE(nper, pmt, pv, [fv], [type], [guess]).

nper: Payment periods. Typically in months.

pmt: EMI (Payment per period). You will need to put -ve value of this in your formula. Your pmt and rate should be on the same scale. i.e if you are planning to pay up monthly, the pmt in your formula should be monthly only.

pv: Your loan amount. You will need to put +ve value of this in your formula.
Note - Either PMT or PV should be -ve. Both can't be +ve and -ve at the same time.

+ve / -ve requires some explanation and this can not be ignored. It depends upon your cashflow. If you are taking a loan, hence cash in, hence pv is +ve. But every month, you will have to pay up something, hence cash out. Hence, PMT is -ve. If you are investing, hence

cash out. Hence pv is -ve. But every month, you will be receiving something, hence cash in. Hence, PMT is +ve.

fv: Your remaining value after you finish your installment. Generally, it is 0 as any lender will like to recover its money fill. (Default is 0)

type: 0 - At the end of the period, 1 - At the beginning of the period (Default is 0)

guess: If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Once again, note that if PMT is monthly, then Guess should also be monthly. Hence, if you are giving annual interest rate of 12%, guess should be given as 12%/12 = 1%.

Also note, fv, type and guess are optional and may not be required in your formula.

The formula used in the below picture is =RATE(B1,-B2,B3,B4,B5,B6/12)

The below EMI Calculator can be download from here http://eforexcel.com/wp/wp-content/uploads/2014/12/RATE-Calculator.xlsx

	A	B	C
1	Total Payment Periods	36	Months
2	EMI Per Month	332.14	
3	Loan Amount	10000	
4	Future Value	0	
5	EMI Due Type	0	
6	Guess	9%	Yearly
7			
8	Interest Rate	1.00%	
9	Annual Interest Rate	12.00%	

0 - At the end of the Period
1 - At the beginning of the period

62. Financial Function – Calculate Compounded Interest

As part of our Mathematics courses in our childhood, we had learned about Compounded Interest. The famous formula which we remember is
Compounded Balance = Principal x (1+rate)^N

This is a fairly easy job to do in Excel. The formula to be used is FV.

Excel help describes FV as "Returns the future value of an investment based on periodic, constant payments and a constant interest rate".

The syntax of FV is FV(rate,nper,pmt,[pv],[type])

You require only 3 pieces of information for Compounded Balance.

rate: Interest rate on which compounding needs to be done

nper: Total number of periods for which compounding needs to be done. Now rate and nper should be on the same scale. If interest rate is monthly, then nper should be in months. If interest rate is quarterly, then nper should be in quarter. If interest rate is annual, then nper should be in years.

pv: This is the initial principal and it has to be specified in -ve. (Note, I have already discussed significance of +ve and -ve in many previous tips on Financial Functions.)

The formula used in below picture for Monthly

=FV(B1/12,B3*12,0,-B2)

The formula used in below picture for Quarterly

=FV(F1/4,F3*4,0,-F2)

The formula used in below picture for Yearly

=FV(J1,J3,0,-J2)

The Compounded Balance Calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Compounded-Interest-Calculator.xlsx

63. Financial Function – Calculate Effective Interest

You are applying for a loan and an interest rate has been quoted. The interest rate which is quoted is called "Nominal Interest Rate". They will quote Nominal Interest Rate in yearly terms. Hence, if they quote 12% interest for a loan, this is yearly figure. Now, you generally pay EMIs every month. They simply say that you need to pay 1% monthly interest which has been derived by annual interest rate / 12 which 12%/12=1% in this case.

But actually interest rate of 1% (nominal monthly interest rate) is compounded every month, hence your effective interest rate per year becomes higher. But lending financial institutions doesn't quote this higher rate as it will make your loan cost look higher.

To calculate **Effective Interest Rate**, Excel has provided a function called EFFECT.

Excel describes EFFECT - Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

The syntax of EFFECT is EFFECT(nominal_rate, npery).

Nominal Rate - Annual Interest Rate

npery - Compounding periods in a Year. For monthly payments, it is 12. For quarterly payments, it is 4.

In the below picture, the effective interest rate is 12.68% for a monthly payment. This may be a small difference for a year or two, but if you take mortgage on housing which is say for 20 years, this makes hell of a difference.

The formula used is =EFFECT(B1,B2)

Now, if you are making an investment and making monthly payments, you will be getting annual return of 12.68% against 12% if you make yearly payment.

The effective interest rate calculator can be downloaded from http://eforexcel.com/wp/wp-content/uploads/2014/12/Effective-Interest-Calculator.xlsx

	A	B	C	D	E	F	G
1	Interest	12%	Yearly		Interest	12%	Yearly
2	Compounding Periods in a Year	12	Months		Compounding Periods in a Year	4	Quarters
3							
4							
5	Effective Interest Rate	12.68%			Effective Interest Rate	12.55%	
6							
7	Monthly Compounding				Quarterly Compounding		
8							

64. Abbreviate Given Names

If you have names given like -
Smith Johnson
Liz lotte
Christy tiara Lewisk
John

And you need to produce abbreviations or acronyms for them like below in all capitals

Smith Johnson - SJ
Liz lotte - LT
Christy tiara Lewisk - CTL
john - J

Then you can use following formula for the same for upto 3 words in the name -

```
=UPPER(TRIM(LEFT(A1,1)&MID(A1,FIND(" ",A1&"
")+1,1)&MID(A1,FIND("*",SUBSTITUTE(A1&"  "," ","*",2))+1,1)))
```

Explanation for the formula

1. LEFT(A1,1) - Extracts the first letter from the first name
2. MID(A1,FIND(" ",A1&" ")+1,1) -
FIND(" ",A1&" ") - Find finds the first space in the given name to locate the start of the middle name. " " has been concatenated at the end of A1 so that if there is only first name, FIND will not give error as it will always find the blanks. +1 has been added to start the MID position from where the middle name starts.
3. MID(A1,FIND("*",SUBSTITUTE(A1&" "," ","*",2))+1,1))
SUBSTITUTE(A1&" "," ","*",2) will replace the second blank with a *, hence we can find the position of * to locate the start of last name. As in 2 above, a double space " " has been added in A1 so that FIND always finds the second space. +1 has been added to start the MID position from where the last name starts.
4. TRIM will remove all blanks inserted because of 2 or 3.
5. UPPER will convert the string to all capitals.
Note - If you don't to use the concatenation of single space and double space as in 2 and 3, then IFERROR block can be used. In this case, the formula would become -

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")))
```

Note - This technique can be used to extend up to many words. Only change will be in last block where you can replace 2 with 3, 4,5 and so on in IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"") for 4th, 5th, 6th words and concatenate them....Hence for upto 6 words, the formula would become

```
=UPPER(TRIM(LEFT(A1,1)&IFERROR(MID(A1,FIND("
",A1)+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",2))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1,"
","*",3))+1,1),"")&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",4))+1,1),"")
&IFERROR(MID(A1,FIND("*",SUBSTITUTE(A1," ","*",5))+1,1),"")))
```

65. Get Column Name for a Column Number

Let's suppose, you have a number in A1 and you want to get the column Name for that.

Hence, if A1=1, you want "A"
Hence, if A1 =26, you want "Z"
Hence, if A1=27, you want "AA" and so on.

The formula to derive the column name would be be -

```
=SUBSTITUTE(ADDRESS(1,A1,4),1,"")
```

66. Get Column Range for a Column Number

Let's suppose, you have a number in A1 and you want to get the column range for that.

Hence, if A1=1, you want "A:A"
Hence, if A1 =26, you want "Z:Z"
Hence, if A1=27, you want "AA:AA" and so on.

The formula to derive the column range would be be -

=SUBSTITUTE(ADDRESS(1,A1,4)&":"&ADDRESS(1,A1,4),1,"")

67. Find the nth Largest Number when there are duplicates

You know the LARGE function which can find the nth largest value. Hence, if you have a series like below -

10
12
18
9
7
14
22
24

And you give =LARGE(A1:A10,3), you get the answer as 18

Now, if we have a series like below

24
22
22
24
18
18
9
24

Now, you give =LARGE(A1:A10,3) and now the result is 24. The reason is that large function gives the nth largest value in a sorted array. Hence, LARGE function will sort the above array as {24,24,24,22,22,18,18,9} and 3rd largest is 24.

But actually you want the unique 3rd largest which is 18 as the answer.

The formula for such case would be

=LARGE(IF(FREQUENCY($A$2:$A$10,$A$2:$A$10)<>0,$A$2:$A$10),3)

68. Extract Date and Time from Date Timestamp

Suppose you have a date timestamp value in cell A1
A1 = 06/14/15 10:15 PM

And you want to extract date and time out of this.

To extract date, use following formula and format the result cell as date

= INT(A1)

To extract time, use following formula and format the result cell as time

= MOD(A1,1)

69. Convert a Number into Years and Months

Suppose, you have been given a number into cell A1 say 26 and you want to display it as 2 Years and 4 Months, you can use following formula -

=INT(A1/12)&" Years and "&MOD(A1,12)&" Months"

Now, an user can become more demanding and he can say that if month is less than 12, then Years should not be displayed. For example, he might say that 8 should be converted to 8 Months and it should not be shown as 0 Years and 8 Months.

In this case, the formula would be -

=IF(INT(A1/12)>0,INT(A1/12)&" Years and ","")&MOD(A1,12)&" Months"

Now 8 will be displayed as 8 Months only not as 0 Years and 8 Months.

Now, user can ask more. He can say when I give 12, it displays as 1 Years and 0 Months and he simply wants to see 1 Years only. And for 36, he wants to see only 3 Years not 3 Years 0 Months. In this case, formula will have to be tweaked more. Now, the formula becomes -

=IF(INT(A1/12)>0,INT(A1/12)&" Years ","")&IF(MOD(A1,12)=0,"",MOD(A1,12)&" Months")

Now an user can come and can ask for one last thing. He can say that if this is 1 Year or 1 Month, it should not be displayed as Years or Months as 1 is not plural. Hence, 25 should be displayed as 2 Years and 1 Month not as 2 Years and 1 Months. Hence, 18 should not be displayed as 1 Years and 6 Months but as 1 Year and 6 Months. Similarly 13 should be displayed as 1 Year and 1 Month not as 1 Years and 1 Months.

=IF(INT(A1/12)>0,INT(A1/12)&" Year"&IF(INT(A1/12)>1,"s","")&" and ","")&MOD(A1,12)&" Month"&IF(MOD(A1,12)>1,"s","")

70. COUNTIF for non-contiguous range

All of us love COUNTIF. And it is very easy to do - just say =COUNTIF("A1:A100",">5") and it finds all the values within the range A1 to A100 which are greater than 5. But what if I wanted the result for only A3, A8 and it should omit other cells. Try putting in following formula -

=COUNTIF((A3, A8),">5") and it will give you #VALUE error.

A possible solution is

=(A3>5)+(A8>5)

What happens if you need to do for A3, A4, A5, A8, A24, A40, A45, A89. Now, you will have to use a formula like -

=(A3>5)+(A4>5)+(A5>5)+(A8>5)+(A24>5)+(A40>5)+(A45>5)+(A89>5)

The formula becomes cumbersome as the number of cells increase. In this case, you can use below formula. This single formula can take care of contiguous (like A3:A5) and non-contiguous ranges both -

=SUM(COUNTIF(INDIRECT({"A3:A5","A8","A24","A40","A45","A89"}),">5"))

71. Count the Number of Words in a Cell / Range

Suppose you have been given the following and you need to count the number of words in a cell or in a range.

Formula for calculating number of words in a cell -

=LEN(TRIM(A1))-LEN(SUBSTITUTE(TRIM(A1)," ",""))+(TRIM(A1)<>"")

Formula for calculating number of words in a range -

=SUMPRODUCT(LEN(TRIM(A1:A100))-LEN(SUBSTITUTE(TRIM(A1:A100)," ",""))+(TRIM(A1:A100)<>""))

72. Numerology Sum of the Digits aka Sum the Digits till the result is a single digit

In Numerology, it is often a task to add the digits till the result is a single digit. For example,

74 = 7 + 4 = 11 = 1 + 1 = 2
23 = 2 + 3 = 5
78 = 7 + 8 = 15 = 1 + 5 = 6
1234567 = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28 = 2+ 8 = 10 = 1+ 0 = 1

The formula to achieve the same is

=MOD(A1-1,9)+1

73. Generate Sequential Numbers and Repeat them

Suppose, you have been given the task to generate a sequence of numbers and repeat them.

For example -
1,2,3,4,1,2,3,4,1,2,3,4

You can use the below formula and drag down -

=MOD(ROWS($1:1)-1,4)+1

Replace 4 with with any other number to generate any other sequence. Hence, if you want to generate 1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10 then formula becomes -

=MOD(ROWS($1:1)-1,10)+1

The structure of the formula is

=MOD(ROWS($1:1)-1,X)+Y

X - Number of numbers
Y - Starting Number

Utilizing above formula, you want to generate the sequence 5,6,7,8,9,10,5,6,7,8,9,10,5,6,7,8,9,10, then use below formula (You need 6 numbers and stating number is 5)

=MOD(ROWS($1:1)-1,6)+5

74. Repeat a Number and Increment and Repeat....

Suppose, you have been given the task of repeating a number and increment that number and repeat it. For example -

1,1,1,1,2,2,2,2,3,3,3,3.....(Here, we are repeating it 4 times and incrementing and repeating 4 times again and so on)

Then you can use following formula

=ROUNDUP(ROWS($1:1)/4,0)

Suppose, you want to start the number with 5 not 1, then you can use below formula -

=ROUNDUP(ROWS($1:1)/4,0)+4

Hence, general structure of the formula is

=ROUNDUP(ROWS($1:1)/X,0)+Y-1

X - Number of times a particular number is repeated
Y - Starting Numbers

Hence, if you want to start with number 7 and you want to repeat it 5 times, then following formula should be used

=ROUNDUP(ROWS($1:1)/5,0)+6

75. Generate Non Repeating Random Numbers through Formula

Suppose, you want to generate non-repeating random numbers between 1 to 30, you can use following formula in A2 and drag down

=IFERROR(AGGREGATE(14,6,ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))), RANDBETWEEN(1,30-ROWS($1:1)+1)),"")

Note: $A$1:$A1 is with reference to A2 as you put formula in A2 and dragged down. Suppose, you had put the formula in G4, this should be replaced with $G$3:$G3.

If your starting and ending numbers are in B1 and C1, use below formula

=IFERROR(AGGREGATE(14,6,ROW(INDIRECT($B$1&":"&$C$1))*
NOT(COUNTIF($A$1:$A1,ROW(INDIRECT($B$1&":"&$C$1)))),
RANDBETWEEN($B$1,$C$1-ROWS($1:1)+1)),"")

For versions, prior to 2010 following basic construct can be used (Build error handling depending upon the version. For example, Excel 2007 will support IFERROR whereas 2003 supports ISERROR) -

=LARGE(INDEX(ROW($1:$30)*NOT(COUNTIF($A$1:$A1, ROW($1:$30))),,),
RANDBETWEEN(1,30-ROW(A1)+1))

76. Financial Year Formula (e.g. 2015-16 or FY16)

A good number of countries don't follow calendar year as the financial year. For example, India's financial year start is 1-Apr and finishes on 31-Mar. Hence, currently (20-Feb-16), the financial year is 2015-16 (It is also written as FY16). On 1-Apr-16, it will become 2016-17 (It is also written as FY17).

Now if a date is given, then following formula can be used to derive 2015-16 kind of result.

=YEAR(A1)-(MONTH(A1)<=3)&"-"&YEAR(A1)+(MONTH(A1)>3)

To generate FY16 kind of result, following formula can be used

="FY"&RIGHT(YEAR(A1)+(MONTH(A1)>3),2)

77. First Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the first working day of the year (format the result as date)

=WORKDAY(EOMONTH("1JAN"&A1,-1),1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY(EOMONTH("1JAN"&A1,-1),1,D1:D10)

=WORKDAY.INTL(EOMONTH("1JAN"&A1,-1),1,"0000110",D1:D10)

Where range D1:D10 contains the list of holidays.

78. Last Working Day of the Year

If a year is given in A1 say 2016, below formula can be used to know the last working day of the year (format the result as date)

=WORKDAY("1JAN"&A1+1,-1)

The above formula assumes that your weekends are Saturday and Sunday.
But, if your weekends are different (e.g. in gulf countries), you can use following formula -

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110")

Where 0000110 is a 7 character string, 1 represents a weekend and 0 is a working day. First digit is Monday and last digit is Sunday. The above example is for Gulf countries where Friday and Saturday are weekends.

You also have option to give a range which has holidays. In that case, your formula would become

=WORKDAY("1JAN"&A1+1,-1,D1:D10)

=WORKDAY.INTL("1JAN"&A1+1,-1,"0000110",D1:D10)
Where range D1:D10 contains the list of holidays.

79. Convert from Excel Date (Gregorian Date) to Julian Date

Q. First what is a Julian Date?
A. A Julian date has either 7 digits or 5 digits date and these are generally used in old IT legacy systems.
7 Digits - YYYYDDD - 2016092 (This is 1-Apr-2016. 92 means that this is 92nd day from 1-Jan in that year)
5 Digits - YYDDD - 16092

Q. What formulas to use to convert Excel Dates to Julian Dates?
A. For 7 Digits, use following formula

=TEXT(A1,"yyyy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

For 5 Digits, use following formula

=TEXT(A1,"yy")&TEXT(A1-("1JAN"&YEAR(A1))+1,"000")

80. Convert from Julian Dates to Excel (Gregorian) Dates

For 7 Digits Julian Dates, following formula should be used

=DATE(LEFT(A1,4),1,RIGHT(A1,3))

For 5 Digits Julian Dates, following formula should be used depending upon which century (Note - Julian dates are most likely to fall into 20th Century)

21st Century

=DATE(20&LEFT(A1,2),1,RIGHT(A1,3))

20th Century

=DATE(19&LEFT(A1,2),1,RIGHT(A1,3))

Note - 19 or 20 can be replaced with some IF condition to put in right 19 or 20 depending upon the year. For example, year 82 is more likely to be in 20th century where year 15 is more likely to be in 21st century.

81. Extract User Name from an E Mail ID

Assuming A1 has a mail ID say A1:=v.a.verma@gmail.com and you need to retrieve v.a.verma which is user name in the mail ID. Use following formula –

=IFERROR(LEFT(A1,SEARCH("@",A1)-1),"")

82. Extract Domain Name from an E Mail ID

If you want to retrieve domain name which in above example is gmail.com, use following formula –

=REPLACE(A1,1,SEARCH("@",A1)+1,"")

83. Location of First Number in a String

Suppose you have A1: = "abfg8ty#%473hj" and you want to find what is the position of first number in this. In this string, first number is 8 and its position is 5. You can use following formula -

=IFERROR(AGGREGATE(15,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

84. Location of Last Number in a String

In the above example, last number is 3 and its position is 12. You can use following formula to find this –

=IFERROR(AGGREGATE(14,6,FIND({1,2,3,4,5,6,7,8,9,0},A1,ROW(INDIRECT("1:"&LEN(A1)))),1),"")

85. Find the Value of First Non Blank Cell in a Range

=IFERROR(INDEX(A1:A10,MATCH(TRUE,INDEX(NOT(ISBLANK(A1:A10)),,),0)),"").

86. Find First Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISNUMBER(A1:A100),,),0)),"")

87. Find Last Numeric Value in a Range

=IFERROR(1/LOOKUP(2,1/A1:A100),"")

88. Find First non Numeric Value in a Range

=IFERROR(INDEX(A1:A100,MATCH(1,INDEX(--ISTEXT(A1:A100),,),0)),"")

89. Find Last non Numeric Value in a Range

=IFERROR(LOOKUP(REPT("z",255),A1:A100),"")

90. Find Last Used Value in a Range

= IFERROR(LOOKUP(2,1/(A1:A100<>""),A1:A100),"")

91. MAXIF

Note – Excel 2016 has introduced MAXIFS function

Suppose you want to find the Maximum Sales for East Region i.e. MAXIF

	A	B
1	**Region**	**Sales**
2	East	1246
3	West	5125
4	South	6513
5	North	9958
6	East	4925
7	West	7783
8	South	6359
9	North	9014
10	East	6371
11	West	8811
12	South	2995
13	North	3763

=SUMPRODUCT(MAX((A2:A100="East")*(B2:B100)))

=AGGREGATE(14,6,($A$2:$A$100="East")*($B$2:$B$100),1)

SUMPRODUCT formula is faster than the second formula.

92. MINIF

Note – Excel 2016 has introduced MINIFS function

Suppose you want to find the Minimum Sales for West Region i.e. MINIF

=AGGREGATE(15,6,1/($A$2:$A$10="West")*($B$2:$B$10),1)

But the above formula will not ignore blanks or 0 values in your range. If you want to ignore 0 values /blanks, in your range, then use following formula

=AGGREGATE(15,6,1/(($A$2:$A$10="West")*($B$2:$B$10<>0))*($B$2:$B$10),1)

93. Generate a Unique List out of Duplicate Entries

Suppose, you have entries in A2:A100 and you want to generate a list containing only unique entries in column C starting C2. You can use following formula in C2 and drag down the formula –

Case 1 – A2:A100 doesn't contain any blanks

=IFERROR(INDEX($A$2:$A$100,MATCH(0,INDEX(COUNTIF($C$1:$C1,$A$2:$A$100),0,0),)),"")

Case 2 – A2:A100 contains blanks. In this case, you will have to use Array formula.

=IFERROR(INDEX($A$2:$A$100, MATCH(0, IF($A$2:$A$100<>"",COUNTIF(C1:$C$1, $A$2:$A$100)), 0)),"")

OR

=IFERROR(INDEX($A$2:$A$100,MATCH(0,COUNTIF($C$1:$C1,$A$2:$A$100&""),0)),"")

Note - Array Formula is not entered by pressing ENTER after entering your formula but by pressing CTRL+SHIFT+ENTER. If you are copying and pasting this formula, take F2 after pasting and CTRL+SHIFT+ENTER. This will put { } brackets around the formula which you can see in Formula Bar. If you edit again, you will have to do CTRL+SHIFT+ENTER again. Don't put { } manually.

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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

CURRICULUM 1.0

B.Tech. (Computer Science and Engineering)

Specialization in Cyber Security and Digital Forensics

(2018- 19) Admitted Students

Category	Core Credits	Elective Credits	Total Credits
Natural Science	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT Bhopal University - B. Tech. Computer Science and Engineering Specialization in Cybersecurity and Digital Forensics (4 years - 180 Credits)															
Code	Natural Sciences	Type	34 Cr.	Code	Engineering and Technology	Type	118 Cr.	Code	Humanities and Management	Type	22 Cr.		Open Electives	Type	6 Cr.
	Core Courses		28 Cr.		*Core Courses*		97 Cr.		*Core Courses*		13 Cr.				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1002	Communication for Technical Professionals	LT	3		Courses Worth 6 Credits		6
CHY1003	Forensic chemistry	LT	3	EEE1001	Electric Circuits and Systems	LTP	4	ENG2002	Legal Writing & reporting	LT	2		Coursera		1/2/3/4
MAT1001	Calculus and Laplace Transforms	LT	4	CSE2001	Object oriented programming with C++	LTP	4	HUM1008	Swachh Bharat	PJ	2				
MAT2001	Differential and Difference Equations	LT	3	ECE2002	Digital logic design	LTP	4	HUM1007	Ethics and Values	LT	2				
MAT3002	Applied Linear Algebra	LT	3	CSD4001	Software Vulnerability Testing	LTP	4	STS1001	Soft skills I	LT	1				
MAT2009	Applied Cryptography	LT	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	STS2001	Soft skills II	LT	1				
MAT2002	Discrete Mathematics and Graph theory	LT	4	CSE2003	Computer architecture and organization	LT	4	EXC1001	Extracurricular Activity	PJ	2				
CHY1002	Environmental Science	LT	3	CSE2004	Theory of computation and compiler design	LT	4								
	Elective Courses (2 Courses to choose from the below list of course for Natural Science)		6 Cr.	CSE3001	Database management systems	LTP	4		Humanities and Management Elective Courses		9 Cr.				
BIO3021	Forensic Biology	LT	3	CSD1001	Principles of Digital Forensics	LT	3		HUM and MGT Elective I	LT	3				
PHY2004	Forensic Physics	LT	3	CSE4001	Internet and web programming	LTP	4		HUM and MGT Elective II	LT	3				
MAT2003	Applied Numerical Methods	LT	3	CSE3003	Operating systems	LTP	4		HUM and MGT Elective III	LT	3				
MAT2004	Operations Research	LT	3	ECE3004	Microprocessors and Microcontrollers	LTP	4		Annexure I – List of courses for Humanities and Management						
MAT3003	Probability, Statistics and Reliability	LT	4	CSD4002	Ethical Hacking	LTP	4								
BIOxxxx	Environmental Sustainability	LT	3	DSN2096	Engineering design	LT	2								

				CSD3002	Secure Software Engineering	LTP	4									
				DSN2098	Project Exhibition – I	PJ	1									
				DSN2099	Project Exhibition – II	PJ	1									
				DSN3099	Engineering Project in Community Service	PJ	2									
				CSE3006	Computer Networks	LTP	4									
				CSD4003	Network and System Security	LP	3									
				CSD4004	Cyber Clinic	P	2									
				CSD2097	Internship	PJ	2									
				CSD4098	Comprehensive Exam	PJ	2									
				CSD4099	Capstone Project	PJ	20									
					Elective Courses		21 Cr.									

Security and Forensics – Electives			
Course code	Course title	Type	Credit
CSD2001	Mobile Device Forensics	LP	3
CSD3004	Cyber Threat Analysis 4	LP	3
CSD3005	Data Privacy 6	LP	3
CSD3006	Android Security	LP	3
CSD3007	Block chains and Crypto currencies 5	LT	3
CSD3008	Machine Learning Forensics	LT	3
CSD4005	Network Forensics	LP	3
CSD4006	File System Forensics	LP	3
CSD4007	Cloud Security 7	LT	3
CSD4008	Cybersecurity Framework	LT	3
CSD4009	Enterprise Cybersecurity	LT	3
CSD4010	Embedded Systems and Security	LP	3
CSD4011	IoT Security	LT	3
CSD4012	Web Security 3	LP	3
CSD4013	Forensic Audio and Video Analysis	LP	3
NASxxxx	NASSCOM 2	LTP	4

HUM and MGT Electives - Electives			
Course code	Course title	Type	Credit
HUM2001	Cyber psychology	LT	3
HUM1002	Emotional Intelligence	LT	3
HUM2002	Forensic Psychology	LT	3
CSD3003	Cyber Crimes and Cyber laws	LT	3
MGT2007	Forensics Accounting and Fraud audit	LT	3
MGT2008	Disaster Recovery and Business Continuity Management	LT	3
HUM2003	Foundations of privacy and security	LT	3
PLA1001	Programming for Computing Engineers	LT	4
MGT1001	Principles of Management	LT	3
MGT1012	Engineering Economics	LT	3
ONLxxxx	VITOL Courses		1/2/3/4

Open - Electives			
Course code	Course title	Type	Credit
PLA1003	Logic and Problem Solving for Engineers	LT	2

Semester Course Arrangement – B Tech (Computer Science and Engineering) Specialization in Cybersecurity and Digital Forensics															
Semester 1				Semester 2				Semester 3				Semester 4			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2002	Legal Writing & reporting	LT	2	CSD1001	Principles of Digital Forensics	LT	3	MAT3002	Applied Linear Algebra	LT	3
PHY1001	Engineering Physics	LTP	4	MAT2009	Applied Cryptography	LT	4	CSE2003	Computer Architecture and Organization	LT	4	CSE3001	Database Management Systems	LTP	4
CHY1003	Forensic Chemistry	LT	3	ECE2002	Digital Logic Design	LTP	4	CSE2004	Theory of Computation and Compiler Design	LT	4	CSE3006	Computer Networks	LTP	4
CSE1001	Introduction to Problem Solving and Programming	LTP	4	CSE2001	Object Oriented Programming with C++	LTP	4	CSD3001	Data Structures and Analysis of Algorithms	LP	3	CSE3003	Operating Systems	LTP	4
MAT1001	Calculus and Laplace Transforms	LT	4	MAT2002	Discrete Mathematics and Graph Theory	LT	4	MAT2001	Differential and Difference Equations	LT	3		NS Elective-I	LT	3
EEE1001	Electric Circuits and Systems	LTP	4	CHY1002	Environmental Science	LT	3		Program Elective-I	LP/LT	3		Program Elective-II	LP/LT	3
HUM1007	Ethics and Values	LT	2	HUM1008	Swachh Bharat	PJ	2	DSN2098	Project Exhibition – I	PJ	1	DSN2099	Project Exhibition – II	PJ	1
								DSN2096	Engineering Design	LT	2	EXC1001	Extra-Curricular Activity	--	2
Total credits			24	Total credits			23	Total credits			23	Total credits			24
Semester 5				Semester 6				Semester 7				Semester 8			
Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.	Course Code	Course Title	Type	Cr.
ECE3004	Microprocessors and Microcontrollers	LTP	4	CSD4002	Ethical Hacking	LTP	4		Program Elective-V	LP/LT	3	CSD4099	Capstone Project	PJ	20
CSD3002	Secure Software Engineering	LTP	4	PLA1003	Open Elective – I (LPSE)		2		Program Elective-VI	LP/LT	3				
CSD4003	Network and System Security	LP	3		Program Elective-III	LP/LT	3		Hum & Mgt Elective-III	LT	3				
CSE4001	Internet and Web Programming	LTP	4		Program Elective-IV	LP/LT	3		Program Elective -VII	LP/LT	3				
PLA1001	Hum & Mgt Elective – I (PCE)	LT	4	CSD4001	Software Vulnerability Testing	LTP	4		Open Elective-II		3				
STS1001	Soft Skills-I	P	1	STS2001	Soft Skills-II	P	1	CSD2097	Internship	---	2				
DSN3099	Engineering project in Community Service	PJ	0	CSD3099	Engineering Project in Community Service	PJ	2	CSD4098	Comprehensive Exam	---	2				
	NS Elective-II	LT	3		Hum & Mgt Elect II	PT	3	CSD4004	Cyber Clinic	P	2				
Total credits			23	Total credits			22	Total credits			21	Total credits			20

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

"483253"GOVT. GIRLS UPPER PRIMARY SCHOOL KHATIKHERA (483253), KHATI KHEDA, KHATI KHE DA

"400304"GOVT. SECONDARY SCHOOL AAGRA (400304), AAGRA, RAJPURA

"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI

"224141"GOVT. GIRLS SENIOR SECONDARY SCHOOL RAWATBHATA- 24 (224141), NP RAWATBHATA _WARD NO.7, NP RAWATBHATA

"407783"GOVT. GIRLS UPPER PRIMARY SCHOOL BARODIYA (407783), BADODIYA1, BADODIYA

"406016"GOVT. GIRLS UPPER PRIMARY SCHOOL BORAV (406016), BORAV, BORAV

"466243"GOVT. GIRLS UPPER PRIMARY SCHOOL EKLINGPURA (466243), EAKLSINGPURA, EKALSING PURA

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"495209"GOVT. SECONDARY SCHOOL CHAINPURA (495209), CHAINPURIYA, MANDESRA

"224125"GOVT. SECONDARY SCHOOL LADPURA (224125), LADPURA, JAL KHEDA

"466269"GOVT. SECONDARY SCHOOL PATLOI (466269), NP RAWATBHATA_WARD NO.24, JAWAHAR NAGAR

"224139"GOVT. SECONDARY SCHOOL RAWATBHATA BAZAR (224139), NP RAWATBHATA_WARD NO .17, NP RAWATBHATA

"224114"GOVT. SECONDARY SCHOOL TAKARDA (224114), TAKRDA, TAMBOLIYA

"466245"GOVT. SECONDARY SCHOOL THAMLAV (466245), THAMLAV, JHALAR BAVDI

"483223"GOVT. SECONDARY SCHOOL UDPURIA (483223), UDPURIYA1, BHAINSROADGARH

"224121"GOVT. SENIOR SECONDARY SCHOOL BADOLIYA BLOCK BHAINSROADGARH (224121), BAD OLIYA, BADOLIYA

"224131"GOVT. SENIOR SECONDARY SCHOOL BALKUNDI KALA (224131), BALKUNDI KALA, BALKU NDI KALA

"224130"GOVT. SENIOR SECONDARY SCHOOL BARKHEDA (224130), BARKHEDA3, BARKHEDA

"224122"GOVT. SENIOR SECONDARY SCHOOL BARODIYA KUNDAL (224122), BADODIYA1, BADODIYA

"225292"GOVT. SENIOR SECONDARY SCHOOL BASSI (225292), BASSI, JAVDA_bhaisrodgarh

"224120"GOVT. SENIOR SECONDARY SCHOOL BHAINSROADGARH (224120), BHAINSROADGARH, BHAINSROADGARH

"224132"GOVT. SENIOR SECONDARY SCHOOL DEVPURA (224132), DEVPURA, DEVPURA

"224116"GOVT. SENIOR SECONDARY SCHOOL DHANGADMOU KALAN (224116), DHAGDMAU KALAN, DHAGDAMU KALAN

"224126"GOVT. SENIOR SECONDARY SCHOOL DHAWADKALA (224126), DHAVAD KALAN, DHAVDK ALAN

"224129"GOVT. SENIOR SECONDARY SCHOOL EKLINGPURA (224129), EAKLSINGPURA, EKALSINGPURA

"224117"GOVT. SENIOR SECONDARY SCHOOL GOPALPURA (224117), GOPALPURA, GOPALPURA

"224124"GOVT. SENIOR SECONDARY SCHOOL JALKHEDA (224124), JAL KHEDA, JAL KHEDA

"224133"GOVT. SENIOR SECONDARY SCHOOL JAWADA (224133), JAVDA, JAVDA_bhaisrodgarh

"224138"GOVT. SENIOR SECONDARY SCHOOL JAWAHAR NAGAR (224138), JAWAHAR NAGAR, JAWAHAR NAGAR

"225291"GOVT. SENIOR SECONDARY SCHOOL JHALAR BAWDI (225291), JHALARBAVDI, JHALAR BAVDI

"224123"GOVT. SENIOR SECONDARY SCHOOL JHARJHANI (224123), JHARJHNI, JARJHANI

"224127"GOVT. SENIOR SECONDARY SCHOOL KHATIKHERA (224127), KHATI KHEDA, KHATI KHEDA

"224137"GOVT. SENIOR SECONDARY SCHOOL LUHARIYA (224137), LUHARIYA, LUHARIYA

"224136"GOVT. SENIOR SECONDARY SCHOOL MANDESRA (224136), MANDESRA, MANDESRA

"224135"GOVT. SENIOR SECONDARY SCHOOL RAJPURA (224135), RAJPURA1, RAJPURA

"224142"GOVT. SENIOR SECONDARY SCHOOL RAWATBHATA (224142), NP RAWATBHATA_WARD N O.1g, NP RAWATBHATA

"224128"GOVT. SENIOR SECONDARY SCHOOL RENKHEDA (224128), RENKHEDA, REN KHEDA

"224118"GOVT. SENIOR SECONDARY SCHOOL SHRIPURA (224118), SHRIPURA1, SHRIPURA

"224113"GOVT. SENIOR SECONDARY SCHOOL TAMBOLIYA (224113), TAMBOLIYA, TAMBOLIYA

"224134"GOVT. SENIOR SECONDARY SCHOOL TOLU KA LUHARIYA (224134), TOLO KA LUHARIYA, T OLO KA LUHARIYA

"407961"GOVT. UPPER PRIMARY SCHOOL BAHELIYA (407961), BAHELIYA, MANDESRA

"502916"GOVT. UPPER PRIMARY SCHOOL BAVDI KHEDA (502916), BAVDI KHEDA, DEVPURA

"413513"GOVT. UPPER PRIMARY SCHOOL BHANDAKUDI (413513), MANDA KUNDI, BASSI

"400184"GOVT. UPPER PRIMARY SCHOOL BHUNJAR KHURD (400184), BHUJAR KHURD, SHRIPURA

"401989"GOVT. UPPER PRIMARY SCHOOL DEEPPURA (401989), DIPPURA1, JARJHANI

"466224"GOVT. UPPER PRIMARY SCHOOL DEM SIDE RAWATBHATA (466224), NP RAWATBHATA_WA RD NO.7, NP RAWATBHATA

"412487"GOVT. UPPER PRIMARY SCHOOL DHANGANMAU KHURD (412487), KUDAL KA KEDHA, DHA GDAMU KALAN

"407784"GOVT. UPPER PRIMARY SCHOOL DHARDI (407784), DHARDI, DHAVDKALAN

"403585"GOVT. UPPER PRIMARY SCHOOL DHOLAI (403585), DHOLAI, REN KHEDA

"487851"GOVT. UPPER PRIMARY SCHOOL G U P S MUWADA (487851), BADGOAN, JAWAHAR NAGAR

"400863"GOVT. UPPER PRIMARY SCHOOL G. U. P. S. KUSHALGARH (400863), KUSHALGARH, MANDE SRA

"407494"GOVT. UPPER PRIMARY SCHOOL G.U.P.S. DOLPURA (407494), DOLPURA, TOLO KA LUHARIY
A

"466257"GOVT. UPPER PRIMARY SCHOOL GILOTA (466257), GILOTA, KHATI KHEDA

"408268"GOVT. UPPER PRIMARY SCHOOL GUPS ARENAKHALA (408268), ARENA KALA, RAJPURA

"495081"GOVT. UPPER PRIMARY SCHOOL GUPS DUDHI TALAI (495081), DUDITALAI, RAJPURA

"466215"GOVT. UPPER PRIMARY SCHOOL JAGPURA (466215), JAGPURA1, BHAINSROADGARH

"466279"GOVT. UPPER PRIMARY SCHOOL JAVRA KALA (466279), JAVRA KALA, BADOLIYA

"442684"GOVT. UPPER PRIMARY SCHOOL KARAN KA KHEDA (442684), DEVPURA, DEVPURA

"442812"GOVT. UPPER PRIMARY SCHOOL KHATI KHEDA KA BADHIYA (442812), EAKLSINGPURA, EK
ALSINGPURA

"407960"GOVT. UPPER PRIMARY SCHOOL KHATI RAMNAGAR (407960), NALI, MANDESRA

"484661"GOVT. UPPER PRIMARY SCHOOL KOLPURA (484661), KOLPURA1, MANDESRA

"483254"GOVT. UPPER PRIMARY SCHOOL KOTDA KUNDAL BADODIYA BHAINSROADGARH CHITTO
RGARH (483254), KOTDA, BADODI

YA
"484707"GOVT. UPPER PRIMARY SCHOOL KUNDALIYA (484707), NP RAWATBHATA_WARD NO.8, NP
RAWATBHATA

"466273"GOVT. UPPER PRIMARY SCHOOL LAXMIPURA (466273), BALKUNDI KALA, JAVDA_bhaisrodga
rh

"483252"GOVT. UPPER PRIMARY SCHOOL MANYAKHERI (483252), MANYA KHEDI, KHATI KHEDA

"502949"GOVT. UPPER PRIMARY SCHOOL MOHAN NAGAR (502949), KEVARPURA, DEVPURA

"487849"GOVT. UPPER PRIMARY SCHOOL MOHANA (487849), MOHNA, EKALSINGPURA

"495415"GOVT. UPPER PRIMARY SCHOOL MOHANPURA (495415), MOHANPURA, DHAVDKALAN

"471593"GOVT. UPPER PRIMARY SCHOOL NAGPURA (471593), NAGPURA, GOPALPURA

"408250"GOVT. UPPER PRIMARY SCHOOL NIMODA (408250), NIMBODA1, BALKUNDI KALA

"480233"GOVT. UPPER PRIMARY SCHOOL PRATAPPURA (480233), PRATPPURA, TAMBOLIYA

"406021"GOVT. UPPER PRIMARY SCHOOL RODI BANDI (406021), BARKHEDA3, BARKHEDA

"409467"GOVT. UPPER PRIMARY SCHOOL SHAMBHUNATH JI KA KHERA (409467), SAMBHUNATH JI KA KHEDA, TAMBOLIYA

"487702"GOVT. UPPER PRIMARY SCHOOL SHYOPURIYA (487702), KHARNAI, BASSI

"466225"GOVT. UPPER PRIMARY SCHOOL SUKHPURA (466225), SUKHPURA2, DHAGDAMU KALAN

"501174"GOVT. UPPER PRIMARY SCHOOL SUTHALA (501174), SUTHALA, LUHARIYA

"471562"GOVT. UPPER PRIMARY SCHOOL UMARCHA (471562), UMRACHA, GOPALPURA

"224115"KAJODIMAL PARASMAL SHARMA GOVT. SENIOR SECONDARY SCHOOL BORAV (224115), B ORAV, BORAV

"224119"MAHATMA GANDHI GOVT. SCHOOL BHENSROAD GARH (224119), BHAINSROADGARH, BHA INSROADGARH

"225390"SWAMI VIVEKANAND GOVT. MODEL SCHOOL, BHAINSROADGARH, CHITTAURGARH (2253 90), DIPPURA1, JARJHANI