Merit Pvt. ITI

Computer Operator & Programming Assistant
&
Database System Assistant

Welcome to our Excel Class

~Rohan Kumar

Function and Formula

In Microsoft Excel, **functions** and **formulas** are essential tools used to perform calculations, manipulate data, and analyze information.

Functions

A Function is a predefined computational operations that helps to perform various calculations like mathematical, statistical, text etc.

It contains only reference and constants.

Formula

Formulas typically use mathematical operations. A **formula** can also contain any or all of the following: functions, references, operators, and constants.

Mathematical Operations	
Plus (+)	Addition
Minus (-)	Subtraction
Asterisk (*)	Multiplication
Slash (/)	Division
Caret (^)	Power
Parentheses	Precedence

➢ Steps for Inserting Function and Formulas

- ❑ Select a cell
- ❑ Type the equal sign =
- ❑ Enter the name of the function
- ❑ Type an opening parenthesis (
- ❑ Select the range of cells (A1:A10). from which data need to be added
- ❑ Then type closing parenthesis)
- ❑ press Enter. The result of the calculation appears in the cell with the formula.

Cell Reference

Cell Reference is the intersection of a row and column, used to describe the location of a cell within a spreadsheet.

Constants

Numbers or text values entered directly into a formula, such as 2.

Operators

The ^ (caret) operator raises a number to a power, and the * (asterisk) operator multiplies numbers.

Function Categories

Text Functions	Math & Numeric Functions.	Date &Time Functions	Logical Functions	Lookup & Reference
•Concatenate() •Len() •Substitute() •Replace() •Left() •Right() •Mid() •Proper() •Upper() •Lower() •TextJoin()	•Sum() •SumIf() •SumIFS() •SumProduct() •Count() •CountA() •CountBlank() •CountIF() •CountIFS() •Modulus() •Power() •Rand() •RandBetween() •Roman() •Round()	•Day() •Month() •Year() •Date() •DatedIF() •Now() •Today() •Workday() •Workday.INTL() •NetworkDays() •NetworkDays.INTL() •EOMonth() •Edate() •Text()	•If() •Ifs() •IfError() •And() •Or() •Not()	•Hlookup() •Vlookup() •Row() •Column() •Choose() •Match() •FormulaText()

❑ TEXT FUNCTIONS

➢ CONCATENATE

This function merges or joins several text strings into one text string.

Syntax : =CONCATENATE(text1, text2, …..,textN)

First Name	Last Name	Full Name
Rohan	Kumar	Rohan Kumar
=CONCATENATE(D3, E3)		

➢ LEN

The function LEN() returns the total number of characters in a string. So, it will count the overall characters, including spaces and special characters.

Syntax : =LEN(A1)

Full Name	Length
Rohan Kumar	11
=LEN(F3)	

➢ REPLACE

The REPLACE() function works on replacing the part of a text string with a different text string.

Syntax : =REPLACE(old_text, start_num, num_chars, “new_text”)

Section A
Roll NO
A101
A102
A103
A104
A105

Section B
Roll NO
B101
B102
B103
B104
B105
=REPLACE(B3, 1,1,"B")

➢ SUBSTITUTE

The SUBSTITUTE() function replaces the existing text with a new text in a text string.

=SUBSTITUTE(text, old_text, new_text, instance_num)

Phone No	Formatted No
123-456-7890	1234567890
132-654-7890	1326547890
123-456-7891	1234567891
132-654-7891	1326547891
123-456-7892	1234567892
	=SUBSTITUTE(B2, "-", "")

➢ LEFT

The **LEFT()** function gives the number of characters from the start of a text string.

=LEFT(text, num_chars)

➢ MID

MID() function returns the characters from the middle of a text string, given a starting position and length.

=MID(text, start_num, num_chars)

➢ RIGHT

The **RIGHT()** function returns the number of characters from the end of a text string.

=RIGHT(text, num_chars)

Full Name	Left	Mid	Right
Rohan Kumar Chaudhary	Rohan	Kumar	Chaudhary
	=LEFT(A2, 5)	=MID(A2, 7, 5)	=RIGHT(A2, 9)

➢ UPPER

The UPPER() function converts any text string to uppercase.

Syntax : =UPPER(text)

➢ LOWER

The LOWER() function converts any text string to lowercase.

Syntax : = LOWER(text)

➢ PROPER

The PROPER() function converts any text string to proper case,
i.e., the first letter in each word will be in uppercase, and all the other will be in lowercase.

Syntax : = PROPER(text)

Text	UPPER	Lower	Proper
hElLo WorLD	HELLO WORLD	hello world	Hello World
	=UPPER(A6)	=LOWER(A6)	=PROPER(A6)

➢ TEXTJOIN

The Excel TEXTJOIN function concatenates multiple values together with or without a delimiter. TEXTJOIN can concatenate values provided as cell references, ranges, or constants, and can optionally ignore empty cells

Syntax :

=TEXTJOIN(delimiter,ignore_empty,text1,[text2],...)

Fname	Lname	Full Name
Rohan	Kumar	Rohan -Kumar
=TEXTJOIN("-", TRUE, A2, A4, B2)		

❑ Math & Numeric Functions

➢ SUM

It returns value of the total of the selected range of cell values.

Syntax : =sum(range)

Price	Function Used Here
41	Total
60	349
56	=SUM(E2:E7)
58	
46	
88	

SUMIF

The Excel SUMIF function returns the sum of cells that meet a single condition. Criteria can be applied to dates, numbers, and text.

Syntax: = SUMIF(criteria_range1, “criteria1”, sum_range)

Product	Region	Price	Quantity	Total
Pencil	North	56	46	2576
Sharpener	East	49	12	588
Compass	South	21	41	861
Pen	North	54	47	2538
Eraser	West	43	20	860
Whitener	East	72	11	792

Total Sales in East Area	5114
=SUMIF(C2:C7,"North",F2:F7)	
Total Sales of quantity which is greater than 25	8215
=SUMIF(F2:F7, ">25")	

➢ SUMIFS

The Excel SUMIFS function returns the sum of cells that meet multiple conditions, referred to as criteria.

Syntax : =SUMIFS(sum_range,range1,criteria1, [range2],[criteria2],...)

Product	Region	Price	Quantity	Total	Total Sales of Pencil in North Area
Pencil	North	30	42	1260	
Sharpener	East	77	10	770	
Compass	South	63	11	693	
Pen	North	30	30	900	
Eraser	West	80	21	1680	
Whitener	East	41	6	246	1260
Pencil	East	100	33	3300	
Sharpener	West	72	11	792	=SUMIFS(F2:F14, B2:B14, "Pencil", C2:C14, "North")
Compass	North	29	26	754	
Pen	North	21	46	966	
Eraser	South	73	45	3285	
Whitener	South	68	18	1224	
Pencil	South	19	38	722	

SUMPRODUCT

The Excel SUMPRODUCT function multiplies ranges or arrays together and returns the sum of products.

Price	Quantity
13	48
61	30
61	47
31	42
95	5
51	38
82	47
17	29
87	11
85	22
44	10
15	21
77	5
Total Sales	17350
=SUMPRODUCT(J2:J14,K2:K14)	

Syntax :

=SUMPRODUCT(array1,[array2],...)

AVERAGE

Returns the average (arithmetic mean) of the arguments.

Price	
28	Average (Mean)
12	
25	
42	
36	47
91	
15	=AVERAGE(J20:J32)
44	
88	
71	
23	
78	
58	

Syntax : =AVERAGE(A1:A10)

- **COUNT** : To count numbers only

  Syntax : = COUNT(A1:D16)

- **COUNTA** : To count numbers and Text only

  Syntax : =COUNTA(A1:D16)

- **COUNTBLANK** : To count numbers and Text only

  Syntax : = COUNTBLANK(A1:D16)

Random	Count
10	4
ab	
20	CountA
	6
14	
	CountBlank
gh	3
50	

- **COUNTIF:** returns the count of cells in a range that meet a single condition.

Syntax : = COUNTIF(range, “condition”)

Product	Region	Price	Total Count of Pencil Sales
Pencil	North	28	
Sharpener	East	64	
Compass	South	23	
Pen	North	49	
Eraser	West	91	
Whitener	East	46	3
Pencil	East	61	
Sharpener	West	80	
Compass	North	49	
Pen	North	67	=COUNTIF(P2:P14, "Pencil")
Eraser	South	28	
Whitener	South	77	
Pencil	South	89	

- **COUNTIFS:** returns the count of cells in a range that meet one or more conditions.

Syntax : = COUNTIF(range, “condition1”, range, condition2)

Product	Region	Price	Total Count of Pencil in South Region
Pencil	North	28	
Sharpener	East	97	
Compass	South	28	
Pen	North	10	
Eraser	West	81	
Whitener	East	81	1
Pencil	East	38	
Sharpener	West	29	=COUNTIFS(P2:P14, "Pencil", Q2:Q14, "North")
Compass	North	75	
Pen	North	16	
Eraser	South	52	
Whitener	South	12	
Pencil	South	77	

➢ MODULUS

The MOD() function works on returning the remainder when a particular number is divided by a divisor

Syntax : =MOD(number, divisor)

Number	Divisor	Remainder
77	7	0
86	4	2
84	6	0
94	5	4
55	3	1
89	8	1
=MOD(W2, X2)		

➢ POWER

The function “Power()” returns the result of a number raised to a certain power.

Syntax : =POWER(number, power)

Number	Power	Remainder
39	4	2313441
30	4	810000
49	4	5764801
44	5	164916224
36	5	60466176
48	4	5308416
=POWER(W11, X11)		

RAND

The Excel RAND function returns a random number between 0 and 1. For example, =RAND() will generate a number like 0.422245717

=RAND()

Random Number	Between 20 to 50
0.336088065	26
0.032429889	30
0.414715768	38

RANDBETWEEN

The Excel RANDBETWEEN function returns a random integer between two given numbers

=RANDBETWEEN(bottom,top)

➢ ROMAN

The Excel ROMAN function converts a number to a Roman numeral as text

Syntax : =ROMAN(number)

S. NO	Roman
1	I
2	II
3	III
4	IV
5	V
=ROMAN(M12)	

➢ ROUND

The Excel ROUND function returns a number rounded to a given number of digits. The ROUND function can round to the right or left of the decimal point.

Syntax =ROUND(number,num_digits)

:Example : =ROUND(2.786,1) // returns 2.8

Decimal Values	Round Values
0.255397597	0.26
0.938789827	0.94
0.158335296	0.16
0.179763986	0.18
=ROUND(P22,2)	

➢ SUBTOTAL

The Excel SUBTOTAL function is designed to run a given calculation on a range of cells while ignoring cells that should not be included. SUBTOTAL can return a SUM, AVERAGE, COUNT, MAX, and others.

Syntax : =SUBTOTAL(function_num,ref1,[ref2],...)

Product	Price
Pencil	16
Sharpener	96
Compass	21
Subtotal	96
=SUBTOTAL(4, T17:T19)	

❑ Date Functions

➢ NOW

The NOW() function in Excel gives the current system date and time

=Syntax : =NOW()

Now
9/18/2024
=NOW()

➢ TODAY

The TODAY() function in Excel provides the current system date.

=TODAY()

Today
9/18/2024
=TODAY()

➢ DAY

The Excel DAY function returns the day of the month as a number between 1 and 31 based on a given date.

Syntax =DAY(date)

Date	Day
8/5/2024	5
8/2/2024	2
8/10/2024	10
8/30/2024	30
=DAY(E6)	

➢ MONTH

The Excel MONTH function extracts the month from a given date as a number between 1 and 12.

Syntax =MONTH(date)

Date	Month
8/5/2024	8
8/2/2024	8
8/10/2024	8
8/30/2024	8
=MONTH(E6)	

➢ YEAR

The Excel YEAR function returns the year component of a date as a 4-digit number.

Date	Year
8/5/2020	2020
8/2/2016	2016
8/10/2020	2020
8/30/2024	2024
=YEAR(E3)	

Syntax =YEAR(date)

➢ DATE

The Excel DATE function creates a valid date from individual year, month, and day components. The DATE function is useful for assembling dates that need to change dynamically based on other values in a worksheet.

Syntax
=DATE(year,month,day)

Day	Month	Year	Date
5	8	2020	44048
2	8	2016	42584
10	8	2020	44053
30	8	2024	45534
=DATE(H3, G3, F3)			

➢ EOMONTH

The Excel EOMONTH function returns the last day of the month, n months in the past or future. You can use EOMONTH to calculate expiration dates, due dates, and other dates that need to land on the last day of a month. Use a positive value for months to move forward in time, and a negative number to move back in time.

Syntax =EOMONTH(start_date,months)

DATE	Last Day of Month
1/1/2024	7/31/2024
2/1/2024	2/29/2024
3/1/2024	3/31/2024
4/1/2024	4/30/2024
=EOMONTH(A3, 6)	

➢ EDATE

The Excel EDATE function returns a date on the same day of the month, n months before or after a start date

Syntax =EDATE(start_date,months)

DATE	EDATE
1/8/2024	3/8/2024
2/1/2024	4/1/2024
3/1/2024	5/1/2024
4/1/2024	6/1/2024
=EDATE(A3, 2)	

➢ TEXT

The TEXT() function in Excel is used to convert a numeric value or date into text, using a specific format.

Syntax = TEXT(value, format_text)

Time	7:54:20 AM	=TEXT(G28, "HH-MM-SS AM/PM")
07-54-20 AM		
Date	9/19/2024	=TEXT(G30, "dd-mmmm-yy")
19-September-24		
Currency	500000.00	=TEXT(G32, "$ ##")
$ 500000		

➢ DATEDIF

The DATEDIF() function provides the difference between two dates in terms of years, months, or days.

=DATEDIF(start_date, end_date, unit)

- ***start_date*** - Start date in Excel date serial number format.
- ***end_date*** - End date in Excel date serial number format.
- ***unit*** - The time unit to use (years, months, or days).

DOB	Days	months	Year
1/22/2002	28	7	22
3/17/2006	2	6	18
12/16/2005	3	9	18
	=DATEDIF(C4, TODAY(), "MD")	=DATEDIF(C4, TODAY(), "YM")	=DATEDIF(C4, TODAY(), "Y")

➢ WORKDAY

The Excel WORKDAY function returns a date in the future or past that is a given number of working days from a specified start date, excluding weekends and (optionally) holidays. You can use the WORKDAY function to calculate things like start dates, delivery dates, and completion dates that need to factor in working and non-working days

Syntax =WORKDAY(start_date,days,[holidays])

Date	WORKDAY()
8/1/2024	8/16/2024
8/2/2024	=WORKDAY(B2, 10,G2:G23)

➢ WORKDAY.INTL

The Excel WORKDAY.INTL function returns a date in the future or past that is a given number of working days from a specified start date, excluding weekends and (optionally) holidays. Unlike the simpler WORKDAY function, WORKDAY.INTL can be configured for a custom workweek, where any day of the week can be a workday or non-workday.

Syntax

=WORKDAY.INTL(start_date,days,[weekend],[holidays])

Date	WORKDAY.INTL()
8/1/2024	8/14/2024
8/2/2024	=WORKDAY.INTL(B2, 10,11, G2:G22)

➢ NETWORKDAYS

The Excel NETWORKDAYS function calculates the number of working days between two dates. NETWORKDAYS automatically excludes weekends (Saturday and Sunday) and can optionally exclude a list of holidays supplied as dates.

Syntax

=NETWORKDAYS(start_date,end_date,[holidays])

Date	NETWORKDAYS()
8/1/2024	11
	=NETWORKDAYS(B2, C2, G2)

➢ NETWORKDAYS.INTL

The Excel NETWORKDAYS.INTL function calculates the number of working days between two dates. NETWORKDAYS.INTL can optionally exclude a list of holidays and provides a way to specify which days of the week are considered weekends.

Syntax=NETWORKDAYS.INTL(start_date,end_date,[weekend],[holidays])

Date	NETWORKDAYS.INTL()
8/1/2024	13
	=NETWORKDAYS.INTL(B2, C2,11, G2)

❑ LOGICAL FUNCTIONS

➢ IF

The IF() function checks a given condition and returns a particular value if it is TRUE. It will return another value if the condition is FALSE.

Syntax : =IF(logical_test, value_if_true, value_if_false)

Roll No	Name	Internal Marks	Result
1	Suman	97	Fail
2	Vishal	110	Fail
3	Rohit	120	Pass
=IF(C3>=120, "Pass", "Fail")			

IFS

The Excel IFS function can run multiple tests and return a value corresponding to the first TRUE result.

Syntax : =IFS(test1,value1,[test2, value2],...)

Roll No	Name	Scored Marks	Result
1	Suman	545	A
2	Vishal	360	C
3	Rohit	267	D
=IFS(K3>=500, "A", K3>=400, "B", K3>=300, "C", K3>=100, "D",K3<100, "Fail")			

➢ SWITCH

The Excel SWITCH function compares one value against a list of values, and returns a result corresponding to the first match found. When no match is found, SWITCH can return an optional default value.

Syntax=SWITCH(expression,val1/result1,[val2/result2],...,[default])

Date	Days
1	Mon
2	Tues
15	NOTA
4	Thurs
5	Fri

```
=SWITCH(B16, 1, "Mon", 2, "Tues", 3, "Wed", 4, "Thurs", 5, "Fri", 6, "Sat", 7,  "Sun", "NOTA")
```

➢ IFERROR

The Excel IFERROR function returns a custom result when a formula generates an error, and a standard result when no error is detected. IFERROR is an elegant way to trap and manage errors without using more complicated nested IF statements.

Syntax : =IFERROR(formula,custom)

Example : =IFERROR(C5/D5,0)

Divisor	Number		
0	165	#DIV/0!	Infinite
2	135	67.5	67.5
3	16	5.33333333	5.3333333
4	141	35.25	35.25
0	106	#DIV/0!	Infinite
=IFERROR(J17/I17, "Infinite")			

AND

The Excel AND function is a logical function used to test multiple conditions at the same time. AND returns TRUE only if all the conditions are met. If any conditions are not met, the AND function returns FALSE.

Syntax : = AND(logical1, logical2,...)

OR

The Excel OR function is a logical function used to test multiple conditions at the same time. OR returns TRUE if any condition is TRUE. If all conditions are FALSE, the OR function returns FALSE.

Syntax : = OR(logical1, logical2,...)

➢ NOT

The Excel NOT function returns the opposite of a given logical or Boolean value. When given TRUE, NOT returns FALSE. When given FALSE, NOT returns TRUE. Use the NOT function to reverse a logical value.

Syntax : = NOT(logical)

Codition Applied	Marks1	Marks2	Condition check
AND	52	23	FALSE
=AND(E21>=33, F21>=33)			
OR	52	23	TRUE
=OR(E23>=33, F23>=33)			
NOT	52		TRUE
=NOT(E25<33)			

❑ LOOKUP FUNCTIONS

➢ HLOOKUP

HLOOKUP is a function that makes Excel search for a certain value in a row (the so called 'table array'), in order to return a value from a different row in the same column. HLOOKUP stands for 'Horizontal Lookup'.

Order ID	1	2	3	4	5
Product	Carrots	Broccoli	Banana	Banana	Beans
Category	Vegetables	Vegetables	Fruit	Fruit	Vegetables
Amount	₹ 4,270.00	₹ 8,239.00	₹ 617.00	₹ 8,384.00	₹ 2,626.00
Date	1/6/2016	1/7/2016	1/8/2016	1/10/2016	1/10/2016
Country	United States	United Kingdom	United States	Canada	Germany

Order ID	Product	Category	Amount	Date	Country
1	Carrots	Vegetables	₹ 4,270.00	1/6/2016	United States
=HLOOKUP($A$9, $A$1:$D$6, COLUMN(), TRUE)					

lookup_value - This indicates the value to lookup.
table - This is the table from which you have to retrieve data.

table_array – This includes a range of table from the starting to the end of a table.

row_index - This is the row number from which to retrieve data.

range_lookup - [optional] This is a boolean to indicate an exact match or approximate match. The default value is TRUE, meaning an approximate match.

➢ VLOOKUP

VLOOKUP is a function that makes Excel search for a certain value in a column (the so called ‘table array’), in order to return a value from a different column in the same row. VLOOKUP is an abbreviation for ‘Vertical Lookup’.

Syntax : =VLOOKUP(lookup_value, table_array, col_index_num, range_lookup)

Order ID	Product	Category	Amount	Date	Country
1	Carrots	Vegetables	₹ 4,270.00	1/6/2016	United States
2	Broccoli	Vegetables	₹ 8,239.00	1/7/2016	United Kingdom
3	Banana	Fruit	₹ 617.00	1/8/2016	United States

Order ID	3
Product	Banana
Category	Fruit
Amount	₹ 617.00
Date	1/8/2016
Country	United States

=VLOOKUP($D$5, $A$1:$F$4, 2, TRUE)

➢ ROW & COLUMN

COLUMN NO :	16384
=COLUMN()	

he Excel **COLUMN** function returns the column number for a reference.

Syntax : =COLUMN([reference])

he Excel **ROW** function returns the row number for a reference.

=ROW()	
ROW No :	1048576

Syntax : =ROW([reference])

➢ CHOOSE

The Excel CHOOSE function returns a value from a list using a given position or index.

DBSA
=CHOOSE(2, "COPA", "DBSA", "ADCA", "BCA", "MCA")

Syntax : =CHOOSE(index_num,value1,[value2],...)

➢ FORMULATEXT

The Excel FORMULATEXT function returns a formula as a text string from a given reference. You can use FORMULATEXT to extract the formula as text from a cell. If you use FORMULATEXT on a cell that doesn't contain a formula, it returns #N/A.

Syntax:=
FORMULATEXT(reference)

21
=DATEDIF(1/9/2024, TODAY(), "MD")
=FORMULATEXT(H5)

➢ MATCH

The MATCH function is used to determine the position of a value in a range or array.

Syntax=MATCH(D6,B6:B14,0)

1	Carrots	Vegetables	₹ 4,270.00	1/6/2016	United States

Carrots	**2**

=MATCH(C17, A15:F15, 0)

Thank You