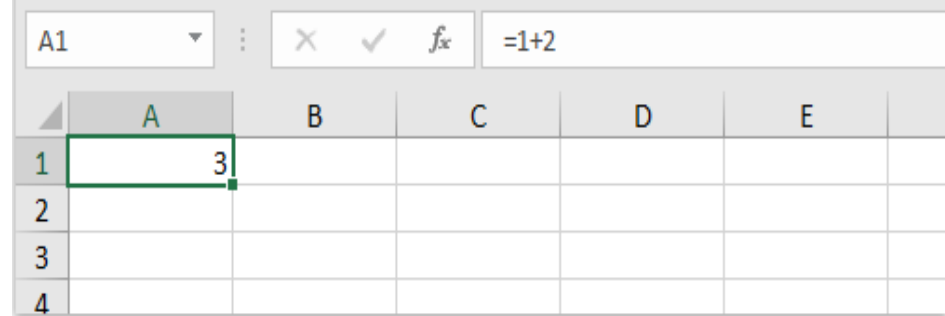


What is a Formula?

A formula in Excel is an expression that returns a specific result. For example:

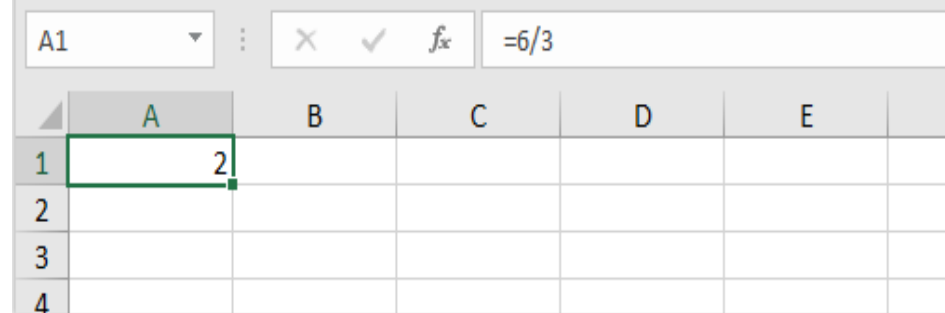
`=1 + 2 // returns 3`



A screenshot of the Microsoft Excel interface. The formula bar at the top shows the formula `=1+2`. Below it, a spreadsheet grid is visible with columns A through E and rows 1 through 4. Cell A1 is selected and highlighted with a green border, displaying the result '3'.

	A	B	C	D	E
1	3				
2					
3					
4					

`=6 / 3 // returns 2`



A screenshot of the Microsoft Excel interface. The formula bar at the top shows the formula `=6/3`. Below it, a spreadsheet grid is visible with columns A through E and rows 1 through 4. Cell A1 is selected and highlighted with a green border, displaying the result '2'.

	A	B	C	D	E
1	2				
2					
3					
4					

Note: all formulas in Excel must begin with an equals sign (=).

Math Operators

The table below shows the standard math operators available in Excel:

Symbol	Operation	Example
+	Addition	=2+3=5
-	Subtraction	=9-2=7
*	Multiplication	=6*7=42
/	Division	=9/3=3
^	Exponentiation	=4^2=16
()	Parentheses	=(2+4)/3=2

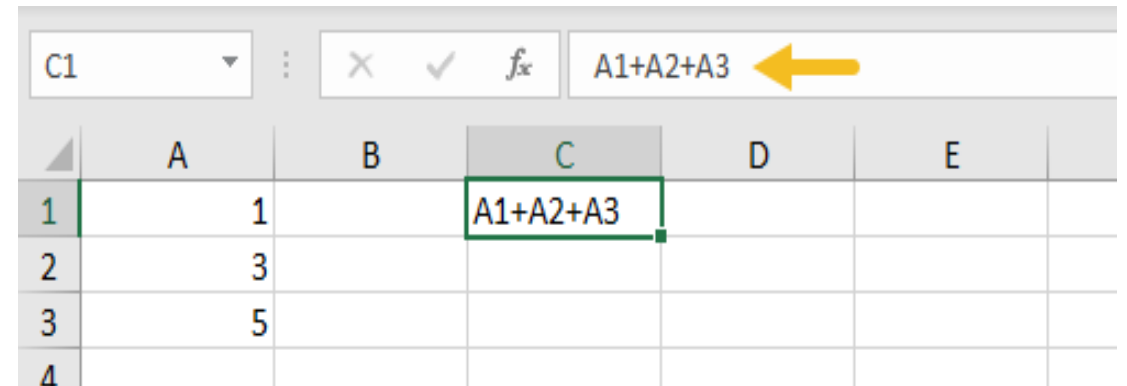
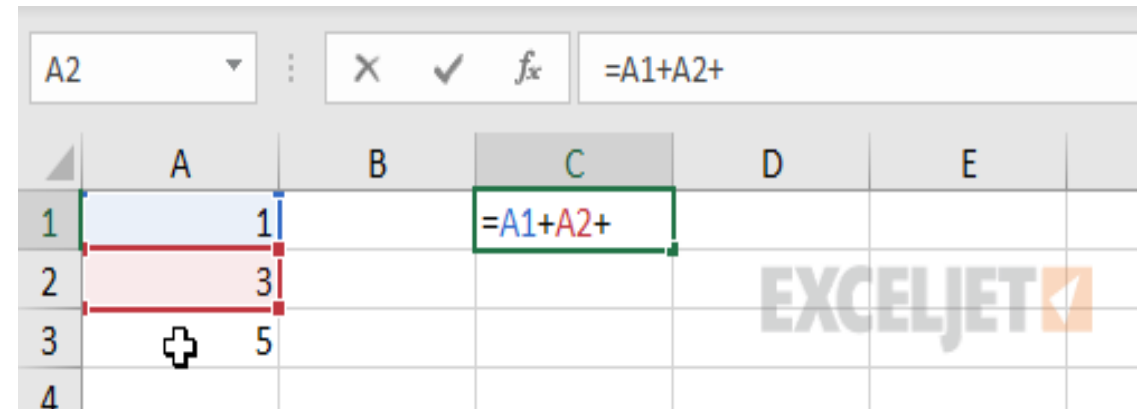
How to Enter a Formula

To Enter a Formula:

1. Select a cell
2. Enter an equals sign (=)
3. Type the formula, and press enter.

Instead of typing cell references, you can point and click, as seen below. Note references are color-coded:

All formulas in Excel must begin with an equals sign (=). No equals sign, no formula:

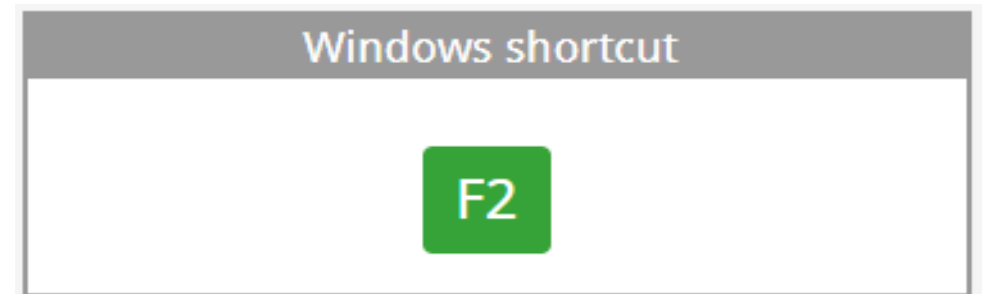
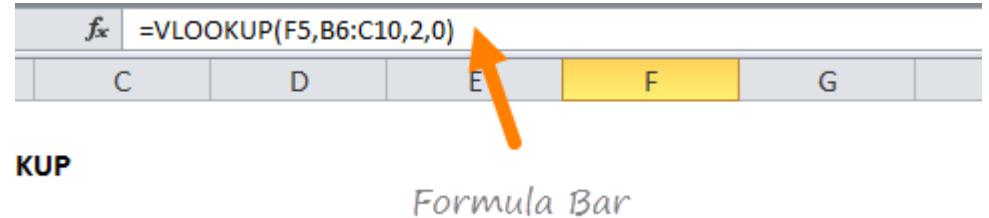


How to Change a Formula

To edit a formula, you have 3 options:

1. Select the cell, edit in the [formula bar](#)
2. Double-click the cell, edit directly
3. Select the cell, [press F2](#), edit directly

No matter which option you use, press Enter to confirm changes when done. If you want to cancel, and leave the formula unchanged, click the Escape key.



What is a Function?

Working in Excel, you will hear the words "formula" and "function" used frequently, sometimes interchangeably. They are closely related, but not exactly the same. Technically, a formula is *any* expression that begins with an equals sign (=).

A function, on the other hand, is a formula with a special name and purpose. In most cases, functions have names that reflect their intended use. For example, you probably know the [SUM function](#) already, which returns the sum of given references:

```
=SUM(1,2,3) // returns 6  
=SUM(A1:A3) // returns A1+A2+A3
```

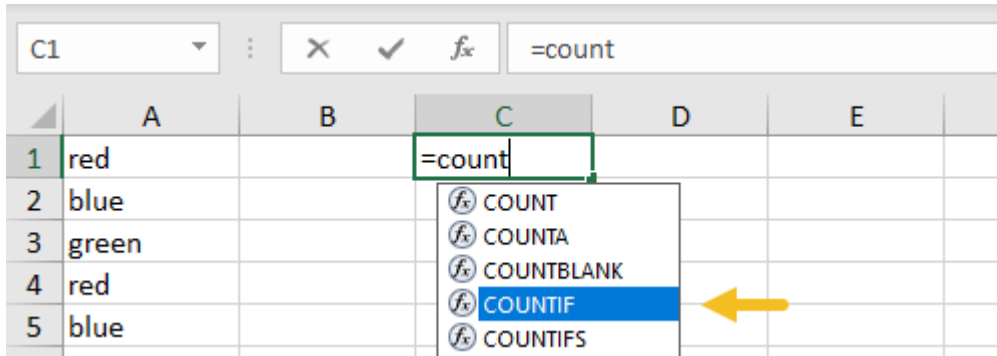
And the MIN and MAX functions return minimum and maximum values, respectively:

```
=MIN(1,2,3) // returns 1  
=MAX(1,2,3) // returns 3
```

How to Enter a function

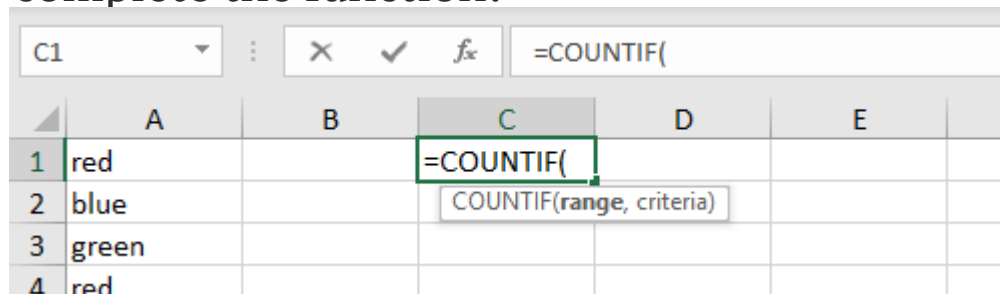
If you know the name of the function, just start typing. Here are the steps:

1. Enter equals sign (=) and start typing. Excel will list of matching functions based as you type:

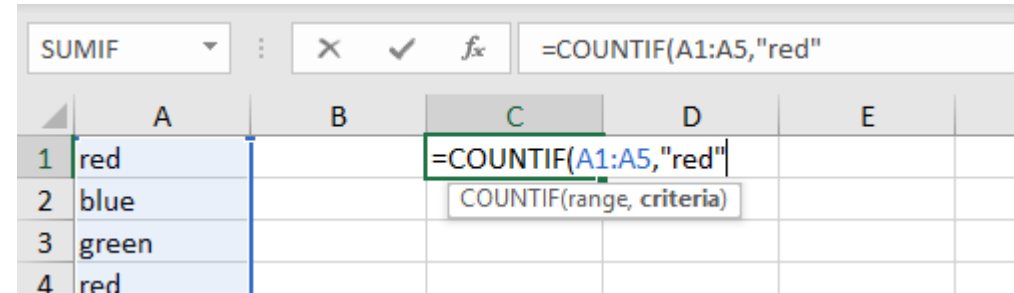


When you see the function you want in the list, use the arrow keys to select (or just keep typing).

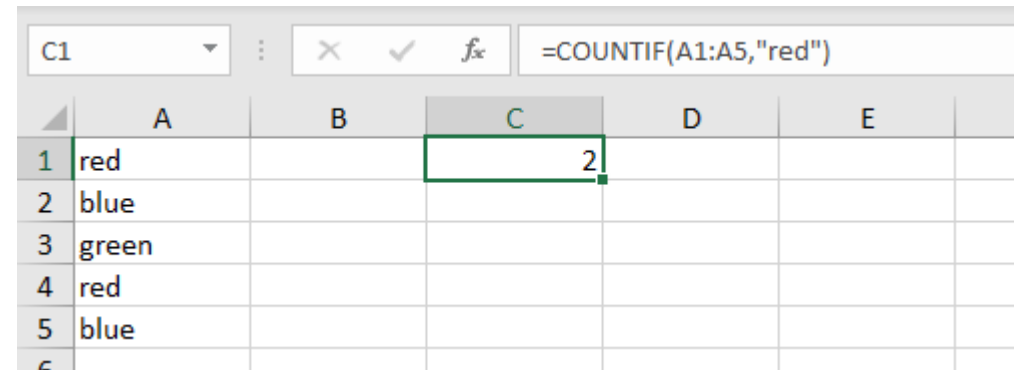
2. Type the Tab key to accept a function. Excel will complete the function:



3. Fill in required arguments:



4. Press Enter to confirm formula:



Function Arguments

Most functions require inputs to return a result. These inputs are called "arguments". A function's arguments appear after the function name, inside parentheses, separated by commas. All functions require a matching opening and closing parentheses (). The pattern looks like this:

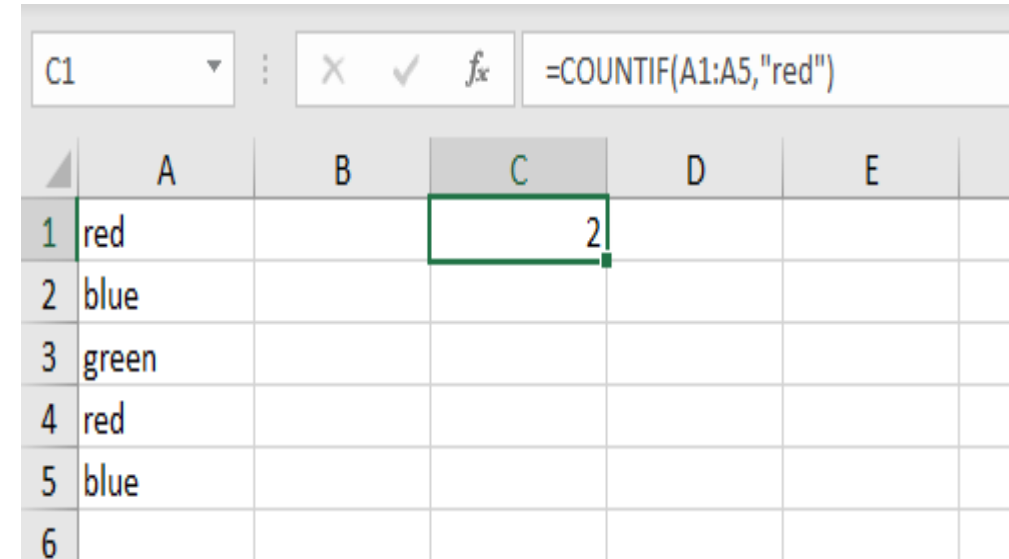
```
=FUNCTIONNAME (argument1, argument2, argument3)
```

For example, the [COUNTIF function](#) counts cells that meet criteria, and takes two arguments, *range* and *criteria*:

```
=COUNTIF (range, criteria) // two arguments
```

In the screen below, range is A1:A5 and criteria is "red". The formula in C1 is:

```
=COUNTIF (A1:A5, "red") // returns 2
```



The screenshot shows an Excel spreadsheet with a formula bar at the top displaying the formula `=COUNTIF(A1:A5, "red")`. The spreadsheet has columns A through E and rows 1 through 6. Column A contains the values "red", "blue", "green", "red", and "blue" in rows 1 through 5 respectively. Cell C1 is selected and contains the value "2", which is the result of the COUNTIF formula. The formula bar also shows the active cell as C1.

	A	B	C	D	E
1	red		2		
2	blue				
3	green				
4	red				
5	blue				
6					

Logical Operators

Logical operators provide support for comparisons such as "greater than", "less than", etc. The logical operators available in Excel are shown in the table below.

Operator	Meaning	Example
=	Equal to	=A1=10
<>	Not equal to	=A1<>10
>	Greater than	=A1>100
<	Less than	=A1<100
>=	Greater than or equal to	=A1>=75
<=	Less than or equal to	=A1<=0

Cell References

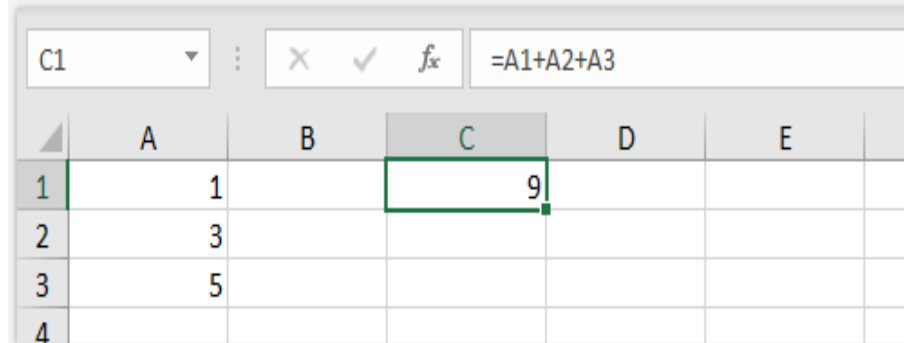
In the examples above, values are "hardcoded". That means results won't change unless you edit the formula again and change a value manually.

Generally, this is considered bad form, because it hides information and makes it harder to maintain a spreadsheet.

Instead, use cell references so values can be changed at any time. In the screen below, C1 contains the following formula:

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`= A1 + A2 + A3 // returns 9`



The screenshot shows a spreadsheet interface. At the top, a formula bar displays the formula `=A1+A2+A3` for cell C1. Below the formula bar is a grid of cells. Column A contains the values 1, 3, and 5 in rows 1, 2, and 3 respectively. Column B is empty. Cell C1, which is highlighted with a green border, contains the value 9. Columns D and E are also empty.

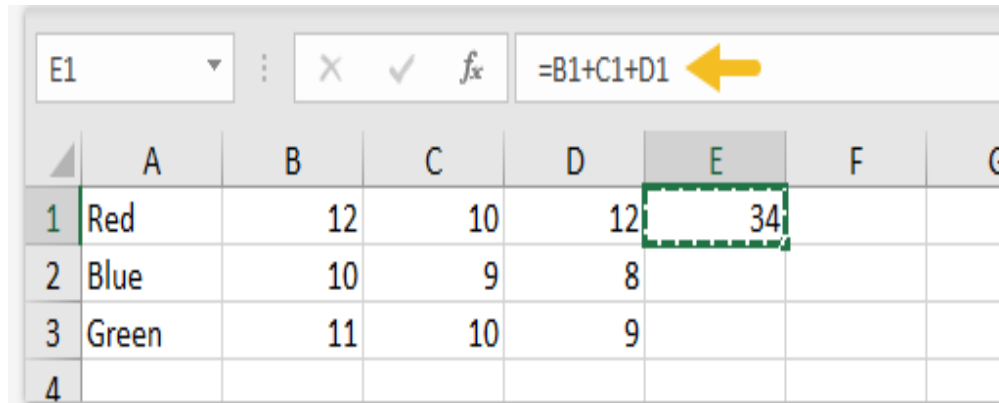
	A	B	C	D	E
1	1		9		
2	3				
3	5				
4					

Notice because we are using cell references for A1, A2, and A3, these values can be changed at any time and C1 will still show an accurate result.

Copy And Paste Formulas

The beauty of cell references is that they automatically update when a formula is copied to a new location. This means you don't need to enter the same basic formula again and again. In the screen below, the formula in E1 has been copied to the clipboard with Control + C:

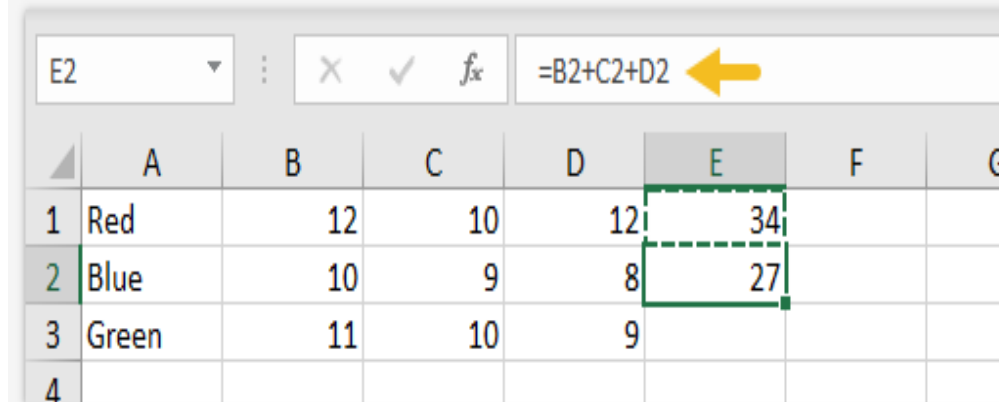
Sir Rizwan Bhatti



The screenshot shows an Excel spreadsheet with columns A through G and rows 1 through 4. The formula bar at the top shows the formula `=B1+C1+D1` being entered into cell E1. A yellow arrow points to the formula bar. The spreadsheet data is as follows:

	A	B	C	D	E	F	G
1	Red	12	10	12	34		
2	Blue	10	9	8			
3	Green	11	10	9			
4							

Below: formula pasted to cell E2 with Control + V. Notice cell references have changed:



The screenshot shows the same Excel spreadsheet as above, but now the formula `=B2+C2+D2` is entered into cell E2. A yellow arrow points to the formula bar. The spreadsheet data is as follows:

	A	B	C	D	E	F	G
1	Red	12	10	12	34		
2	Blue	10	9	8	27		
3	Green	11	10	9			
4							

Same formula pasted to E3. Cell addresses are updated again:

Relative and Absolute References

The cell references above are called relative references. This means the reference is relative to the cell it lives in.

```
= B1 + C1 + D1 // formula in E1
```

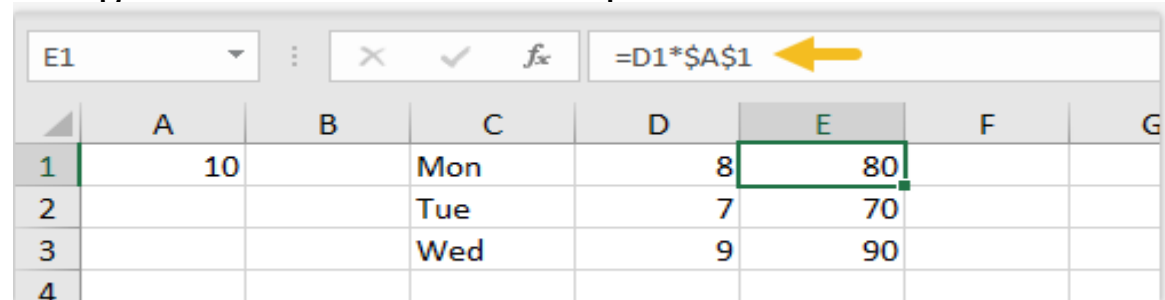
Literally, this means "cell 3 columns left" + "cell 2 columns left" + "cell 1 column left". That's why, when the formula is copied down to cell E2, it continues to work in the same way.

Relative references are extremely useful, but there are times when you don't want a cell reference to change. A cell reference that won't change when copied is called an absolute reference. To make a reference absolute, use the dollar symbol (\$):

```
= A1 // relative reference  
= $A$1 // absolute reference
```

Tip: you can toggle between relative and absolute syntax with the F4 key.

For example, in the screen below, we want to multiply each value in column D by 10, which is entered in A1. By using an absolute reference for A1, we "lock" that reference so it won't change when the formula is copied to E2 and E3:



	A	B	C	D	E	F	G
1	10		Mon	8	80		
2			Tue	7	70		
3			Wed	9	90		
4							

Here are the final formulas in E1, E2, and E3:

```
= D1 * $A$1 // formula in E1  
= D2 * $A$1 // formula in E2  
= D3 * $A$1 // formula in E3
```

```
=$A1 // column locked
```

```
=A$1 // row locked
```

```
=$A$1:A2 // first cell locked
```

Relative References

A relative reference in Excel is a pointer to a cell or range of cells. For example, a relative reference to cell A1 looks like this:

=A1

A relative addresses will change when copied to other location in a worksheet because it describes the "offset" to another cell, rather than a fixed address. To help understand what this means, consider the phrase "the house next door to the right". You can only understand the location of this house if you understand the starting point, because the location is described in relative terms. By default, all references in Excel formulas are relative. You can convert a relative reference to [absolute reference](#) with by using dollar sign (\$) characters.

Example:

In the example shown, the formula in E4 contains two relative references that will change as follows

when copied down column E:

	A	B	C	D	E	F	G	H	I
1									
2									
3									
4			John	5	\$11.00	\$55.00			
5			Sally	2	\$12.00	\$24.00			
6			Julia	5	\$12.50	\$62.50			
7			Ron	9	\$12.00	\$108.00			
8			Harold	8	\$9.00	\$72.00			
9									
10									
11									
12									

The references to C4 and D4 are relative and *will* change when copied.

=C4 * D4
=C5 * D5
=C6 * D6
=C7 * D7
=C8 * D8

Absolute References

An absolute reference in Excel refers to a reference that is "locked" so that rows and columns won't change when copied. Unlike a [relative reference](#), an absolute reference refers to an actual fixed location on a worksheet.

To create an absolute reference in Excel, add a dollar sign before the row and column. For example, an absolute reference to A1 looks like this:

```
=A$1
```

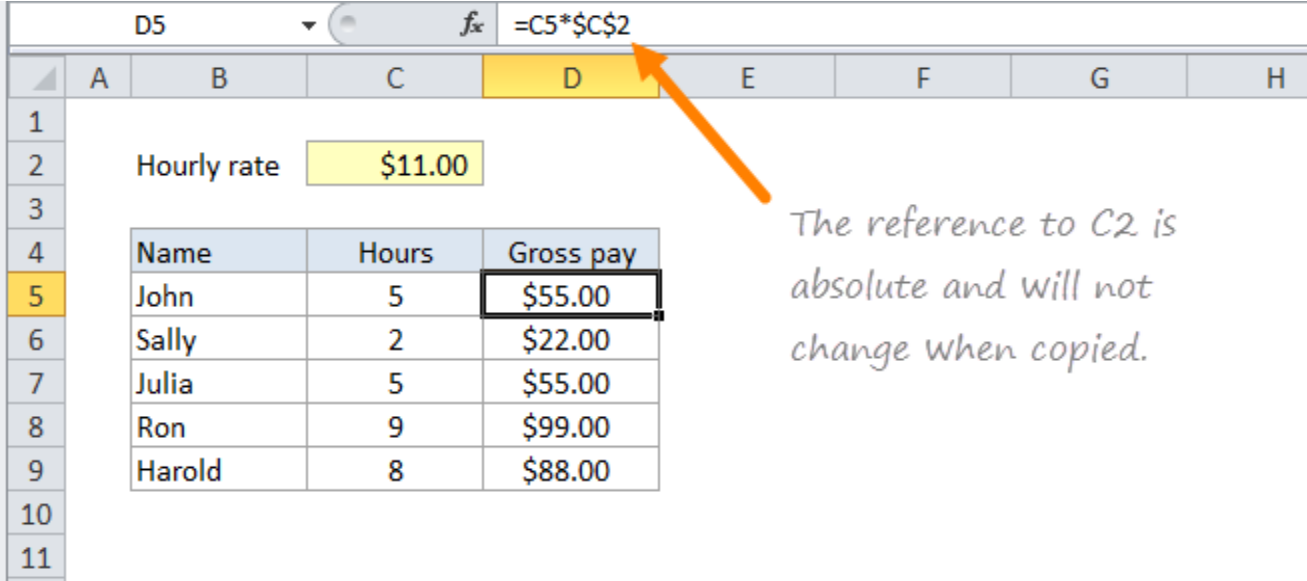
An absolute reference for the range A1:A10 looks like this:

```
=A$1:A$10
```

Example:

In the example shown, the formula in D5 will change like this when copied down column D:

```
=C5*$C$2  
=C6*$C$2  
=C7*$C$2  
=C8*$C$2  
=C9*$C$2
```



	A	B	C	D	E	F	G	H
1								
2		Hourly rate	\$11.00					
3								
4								
5								
6								
7								
8								
9								
10								
11								

Name	Hours	Gross pay
John	5	\$55.00
Sally	2	\$22.00
Julia	5	\$55.00
Ron	9	\$99.00
Harold	8	\$88.00

The reference to C2 is absolute and will not change when copied.

Note that the absolute reference to C2, which hold the hourly rate does not change, while the reference to hours in C5 changes with each new row.

Toggle between absolute and relative addresses

When entering formulas, you can use a keyboard shortcut to [F4](#) without typing dollar signs (\$) manually.

Mixed References

An mixed reference in Excel is a reference where part of the reference is absolute and part is relative. For example, the following references have both relative and absolute components:

```
= $A1 // column locked  
= A$1 // row locked  
= $A$1:A2 // first cell locked
```

Mixed references can be used to set up formulas that can be copied across rows or columns without the need for manual editing. In some cases (3rd example above) they can be used to create a reference that will expand when copied.

Mixed references are a common feature in well-designed worksheets. They are harder to set up, but they make formulas much easier to enter. In addition, they significantly reduce errors since they allow the same formula to be copied to many cells without manual edits.

	A	B	C	D	E	F	G	H
1								
2								
3								
4		2	2	4	6	8	10	
5		4	4	8	12	16	20	
6		6	6	12	18	24	30	
7		8	8	16	24	32	40	
8		10	10	20	30	40	50	
9								
10								
11								

COUNT Function

Summary:

The Excel COUNT function returns the count of values that are numbers, generally cells that contain numbers. Values can be supplied as constants, cell references, or ranges.

Purpose:

Count numbers

Return value:

Count of numeric values

Syntax:

=COUNT (value1, [value2], ...)

E6						
	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						

COUNT (value1, value2 ,...)

	Value
	puppy
	apple
1	100
2	20%
3	0.5
4	28-Oct-2019

Count 4

Arguments:

value1 - An item, cell reference, or range.

value2 - [optional] An item, cell reference, or range.

COUNTA Function

Summary:

The Excel COUNTA function returns the count of cells that contain numbers, text, logical values, error values, and empty text (""). COUNTA does not count empty cells.

Purpose:

Count the number of non-blank cells

Return value:

A number representing non-blank cells.

Syntax:

=COUNTA (value1, [value2], ...)

	A	B	C	D	E	F	G
1							
2		COUNTA (value1, value2 ,...)					
3							
4		Value					
5		puppy					
6		apple			Non-empty		5
7							
8		20%					
9		-3					
10		0.5					
11							
12							
13							

Arguments:

value1 - An item, cell reference, or range.

value2 - [optional] An item, cell reference, or range.

COUNTBLANK Function

Summary:

The Excel COUNTBLANK function returns a count of empty cells in a range. Cells that contain text, numbers, errors, etc. are not counted. Formulas that return empty text are counted.

Purpose:

Count cells that are blank

Return value:

A number representing blank cells

Syntax:

=COUNTBLANK (range)

H5		fx		=COUNTBLANK(B5:G5)					
	A	B	C	D	E	F	G	H	I
1									
2	COUNTBLANK function								
3									
4		1	2	3	4	5	6	Blank	
5		0.592437	0.698525		0.618278		0.7187	2	
6		0.042949	0.231815	0.185179	0.224723	0.437195	0.317542	0	
7		0.829421	0.592394	0.807353	0.058918	0.456367	0.950373	0	
8		0.179294	0.324136		0.311283		0.431638	2	
9		0.950429	0.86344	0.03272	0.852769	0.392676	0.387932	0	
10		0.013879				0.94476	0.918461	3	
11		0.668453	0.607958	0.556335	0.139015	0.231815	0.415497	0	
12									

Arguments:

range - The range in which to count blank cells.

COUNTIF Function

Summary:

COUNTIF is a function to count cells that meet a single criterion. COUNTIF can be used to count cells with dates, numbers, and text that meet specific criteria. The COUNTIF function supports logical operators (>,<,<>=) and wildcards (*,?) for partial matching.

Purpose:

Count cells that match criteria

Return value:

A number representing cells counted.

Syntax:

=COUNTIF (range, criteria)

G5									
	A	B	C	D	E	F	G	H	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									

COUNTIF (range, criteria)

Name	State	Sales
Jim	MN	\$100.00
Sarah	CA	\$125.00
Jane	GA	\$200.00
Steve	CA	\$50.00
Jim	WY	\$75.00
Joan	WA	\$150.00
Jane	GA	\$200.00
Jim	WY	\$50.00

Example	Result
Sales over \$100	4
Sales by Jim	3
Sales in California	2

Arguments:

range - The range of cells to count.

criteria - The criteria that controls which cells should be counted.

COUNTIFS Function

Summary:

The Excel COUNTIFS function returns the count of cells that meet one or more criteria. COUNTIFS can be used with criteria based on dates, numbers, text, and other conditions. COUNTIFS supports logical operators (>,<,<>=) and [wildcards](#) (*,?) for partial matching.

Purpose:

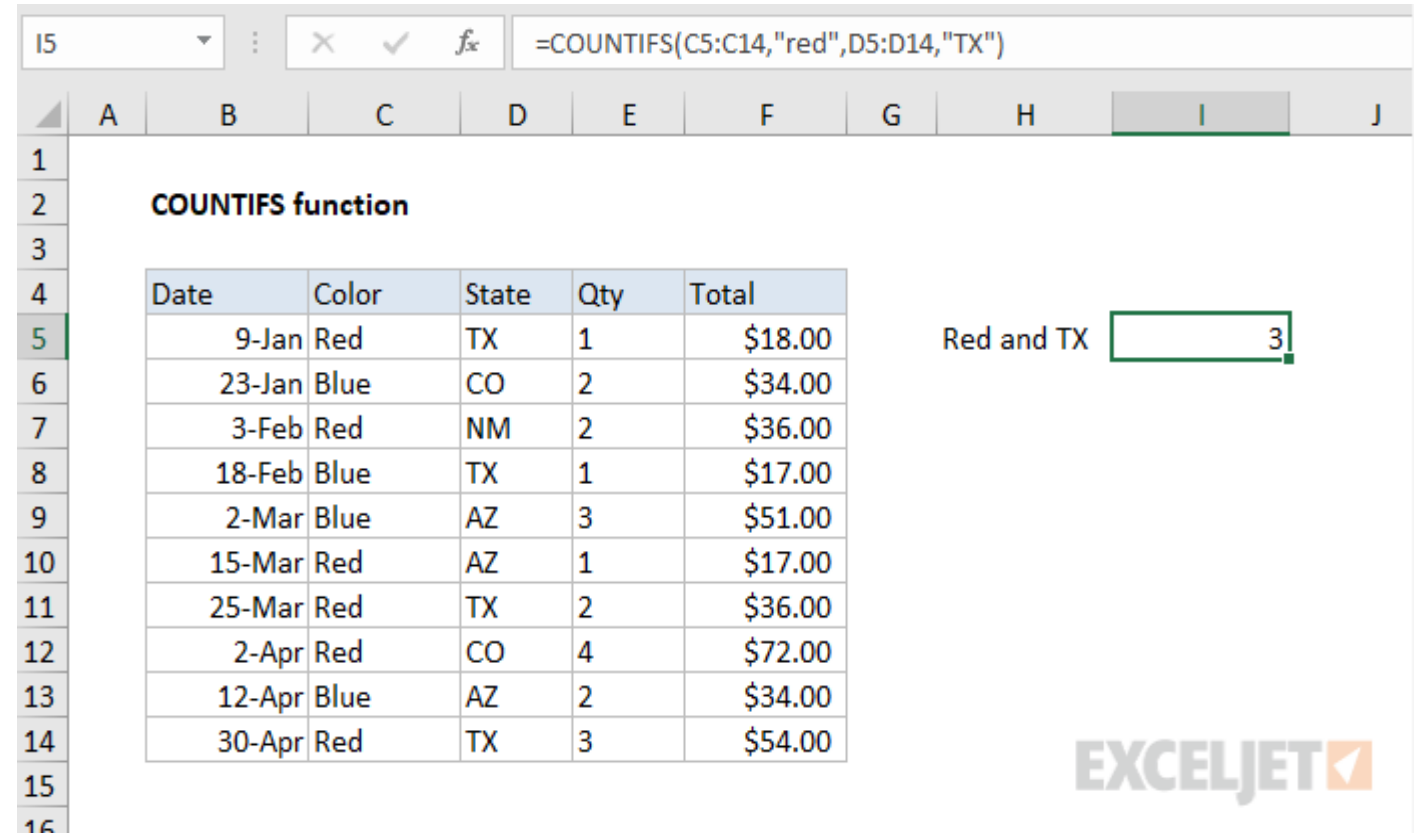
Count cells that match multiple criteria

Return value:

The number of times criteria are met

Syntax:

=COUNTIFS (range1, criteria1, [range2], [criteria2], ...)



The screenshot shows an Excel spreadsheet with the formula bar at the top displaying `=COUNTIFS(C5:C14,"red",D5:D14,"TX")`. Below the formula bar, a table titled "COUNTIFS function" is displayed. The table has five columns: Date, Color, State, Qty, and Total. The data rows show various dates, colors, and states. To the right of the table, the text "Red and TX" is followed by a cell containing the value 3, which is the result of the COUNTIFS function. The Excel logo "EXCELJET" is visible in the bottom right corner.

Date	Color	State	Qty	Total
9-Jan	Red	TX	1	\$18.00
23-Jan	Blue	CO	2	\$34.00
3-Feb	Red	NM	2	\$36.00
18-Feb	Blue	TX	1	\$17.00
2-Mar	Blue	AZ	3	\$51.00
15-Mar	Red	AZ	1	\$17.00
25-Mar	Red	TX	2	\$36.00
2-Apr	Red	CO	4	\$72.00
12-Apr	Blue	AZ	2	\$34.00
30-Apr	Red	TX	3	\$54.00

Arguments:

range1 - The first range to evaluate.

criteria1 - The criteria to use on range1.

range2 - [optional] The second range to evaluate.

criteria2 - [optional] The criteria to use on range2.

SUM Function

Summary:

The Excel SUM function returns the sum of values supplied. These values can be numbers, cell references, ranges, arrays, and constants, in any combination. SUM can handle up to 255 individual arguments.

Purpose:

Add numbers together

Return value:

The sum of values supplied.

Syntax:

=SUM (number1, [number2], [number3], ...)

D12		✕ ✓ <i>fx</i>		=SUM(D6:D10)																					
	A	B	C	D	E	F	G																		
1																									
2	SUM function																								
3	SUM (number1, number2, ...)																								
4																									
5	<table><tr><th>Item</th><th>Quantity</th><th>Cost</th></tr><tr><td>Apples</td><td>5</td><td>\$1.50</td></tr><tr><td>Oranges</td><td>4</td><td>\$1.00</td></tr><tr><td>Bananas</td><td>7</td><td>\$1.05</td></tr><tr><td>Peaches</td><td>5</td><td>\$2.50</td></tr><tr><td>Kiwis</td><td>3</td><td>\$3.00</td></tr></table>							Item	Quantity	Cost	Apples	5	\$1.50	Oranges	4	\$1.00	Bananas	7	\$1.05	Peaches	5	\$2.50	Kiwis	3	\$3.00
Item	Quantity	Cost																							
Apples	5	\$1.50																							
Oranges	4	\$1.00																							
Bananas	7	\$1.05																							
Peaches	5	\$2.50																							
Kiwis	3	\$3.00																							
6																									
7																									
8																									
9																									
10																									
11																									
12	Total		\$9.05																						
13																									

Arguments:

number1 - The first value to sum.

number2 - [optional] The second value to sum.

number3 - [optional] The third value to sum.

SUMIF Function

Summary:

The Excel SUMIF function returns the sum of cells that meet a single condition. Criteria can be applied to dates, numbers, and text. The SUMIF function supports logical operators (>,<,<>=) and wildcards (*,?) for partial matching.

Purpose:

Sum numbers in a range that meet supplied criteria

Return value:

The sum of values supplied.

Syntax:

=SUMIF (range, criteria, [sum_range])

G6		✕ ✓ <i>fx</i>		=SUMIF(D6:D10,">100")																														
	A	B	C	D	E	F	G	H																										
1																																		
2	SUMIF function																																	
3	SUMIF (range, criteria, sum_range)																																	
4																																		
5	<table><tr><th>Rep</th><th>State</th><th>Sales</th></tr><tr><td>Jim</td><td>MN</td><td>\$100</td></tr><tr><td>Sarah</td><td>CA</td><td>\$125</td></tr><tr><td>Jane</td><td>GA</td><td>\$200</td></tr><tr><td>Steve</td><td>CA</td><td>\$50</td></tr><tr><td>Joan</td><td>WA</td><td>\$150</td></tr></table>			Rep	State	Sales	Jim	MN	\$100	Sarah	CA	\$125	Jane	GA	\$200	Steve	CA	\$50	Joan	WA	\$150	<table><tr><th>Criteria</th><th>Total</th></tr><tr><td>Sales > \$100</td><td>\$475</td></tr><tr><td>Rep = Jim</td><td>\$100</td></tr><tr><td>State = CA</td><td>\$175</td></tr></table>					Criteria	Total	Sales > \$100	\$475	Rep = Jim	\$100	State = CA	\$175
Rep	State	Sales																																
Jim	MN	\$100																																
Sarah	CA	\$125																																
Jane	GA	\$200																																
Steve	CA	\$50																																
Joan	WA	\$150																																
Criteria	Total																																	
Sales > \$100	\$475																																	
Rep = Jim	\$100																																	
State = CA	\$175																																	
6																																		
7																																		
8																																		
9																																		
10																																		
11																																		
12																																		

Arguments:

range - The range of cells that you want to apply the criteria against.

criteria - The criteria used to determine which cells to add.

sum_range - [optional] The cells to add together. If sum_range is omitted, the cells in range are added together instead.

SUMIFS Function

Summary:

SUMIFS is a function to sum cells that meet multiple criteria. SUMIFS can be used to sum values when adjacent cells meet criteria based on dates, numbers, and text. SUMIFS supports logical operators (>,<,<=>=) and wildcards (*,?) for partial matching.

Purpose:

Sum cells that match multiple criteria

Return value:

The sum of the cells that meet all criteria

Syntax:

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

16 =SUMIFS(F5:F11,C5:C11,"red",D5:D11,"TX")

	A	B	C	D	E	F	G	H	I	J
1										
2		SUMIFS function								
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										

Criteria	Result
Red	\$107.00
Red and TX	\$54.00

Arguments:

sum_range - The range to be summed.

range1 - The first range to evaluate.

criteria1 - The criteria to use on range1.

range2 - [optional] The second range to evaluate.

criteria2 - [optional] The criteria to use on range2.

MIN Function

Summary:

The Excel MIN function returns the smallest numeric value in a range of values. The MIN function ignores empty cells, the logical values TRUE and FALSE, and text values.

Purpose:

Get the smallest value.

Return value:

The smallest value in the array.

Syntax:

=MIN (number1, [number2], ...)

G6		fx		=MIN(D4:D11)			
	A	B	C	D	E	F	G
1	MIN(number1,[number2],...)						
2							
3		First	Last	Score			
4		Sue	Brown	66			
5		Sarah	Duncan	84			
6		Justin	Gatt	69			
7		Manfred	Hollis	77			
8		Troy	Johnson	69			
9		Aubrey	Sinclair	88			
10		Gen	Tanaka	86			
11		Renee	Zwick	74			

Max	88
Min	66

Arguments:

number1 - Number, reference to numeric value, or range that contains numeric values.

number2 - [optional] Number, reference to numeric value, or range that contains numeric values.

MAX Function

Summary:

The Excel MAX function returns the largest numeric value in a range of values. The MAX function ignores empty cells, the logical values TRUE and FALSE, and text values.

Purpose:

Get the largest value

Return value:

The largest value in the array.

Syntax:

=MAX (number1, [number2], ...)

G5		fx		=MAX(D4:D11)			
	A	B	C	D	E	F	G
1	MAX(number1,[number2],...)						
2							
3		First	Last	Score			
4		Sue	Brown	66			
5		Sarah	Duncan	84			
6		Justin	Gatt	69			
7		Manfred	Hollis	77			
8		Troy	Johnson	69			
9		Aubrey	Sinclair	88			
10		Gen	Tanaka	86			
11		Renee	Zwick	74			

Max	88
Min	66

Arguments:

number1 - Number, reference to numeric value, or range that contains numeric values.

number2 - [optional] Number, reference to numeric value, or range that contains numeric values.

SMALL Function

Summary:

The Excel SMALL function returns numeric values based on their position in a list ranked by value. In other words, it can retrieve "nth smallest" values - smallest value, 2nd smallest value, 3rd smallest value, etc.

Purpose

Get the nth smallest value

Return value

The nth smallest value in the array.

Syntax

=SMALL (array, n)

I4

fx

=SMALL(F4:F13,1)

A

B

C

D

E

F

G

H

I

1

SMALL(array, k)

2

3

First	Last	Start	Finish	Time
Aubrey	Sinclair	7:00:00 AM	8:10:33 AM	1:10:33
John	Smith	7:00:30 AM	8:35:44 AM	1:35:14
Sue	Brown	7:01:00 AM	9:08:06 AM	2:07:06
Troy	Johnson	7:01:30 AM	9:14:07 AM	2:12:37
Manfred	Hollis	7:02:00 AM	9:08:17 AM	2:06:17
Sarah	Duncan	7:02:30 AM	7:59:45 AM	0:57:15
Amy	Samuels	7:03:00 AM	8:24:35 AM	1:21:35
Justin	Gatt	7:03:30 AM	9:10:04 AM	2:06:34
Gen	Tanaka	7:04:00 AM	9:19:35 AM	2:15:35
Renee	Zwick	7:04:30 AM	9:18:38 AM	2:14:08

4

Winning time

0:57:15

5

2nd Place

1:10:33

6

3rd Place

1:21:35

7

7th Place

2:07:06

8

Manfred

Hollis

7:02:00 AM

9:08:17 AM

2:06:17

9

Sarah

Duncan

7:02:30 AM

7:59:45 AM

0:57:15

10

Amy

Samuels

7:03:00 AM

8:24:35 AM

1:21:35

11

Justin

Gatt

7:03:30 AM

9:10:04 AM

2:06:34

12

Gen

Tanaka

7:04:00 AM

9:19:35 AM

2:15:35

13

Renee

Zwick

7:04:30 AM

9:18:38 AM

2:14:08

14

Examples

Winning time

0:57:15

2nd Place

1:10:33

3rd Place

1:21:35

7th Place

2:07:06

EXCELJET

Arguments:

array - A range of cells from which to extract smallest values.

n - An integer that specifies the position from the smallest value, i.e. the nth position.

LARGE Function

Summary:

The Excel LARGE function returns numeric values based on their position in a list when sorted by value. In other words, it can retrieve "nth largest" values - largest value, 2nd largest value, 3rd largest value, etc.

Purpose:

Get the nth largest value

Return value:

The nth largest value in the array.

Syntax:

=LARGE (array, n)

G4		fx		=LARGE(D4:D11,1)			
	A	B	C	D	E	F	G
1	LARGE(array, k)						
2							
3	First	Last	Score				
4	Sue	Brown	66				
5	Sarah	Duncan	84				
6	Justin	Gatt	69				
7	Manfred	Hollis	77				
8	Troy	Johnson	69				
9	Aubrey	Sinclair	88				
10	Gen	Tanaka	86				
11	Renee	Zwick	74				

Rank	Score
1	88
2	86
3	84

Arguments:

array - The array from which you want to select the kth largest value.

n - An integer that specifies the position from the largest value, i.e. the nth position.

IF Function

Summary:

The IF function can perform a logical test and return one value for a TRUE result, and another for a FALSE result. For example, to "pass" scores above 70:

=IF(A1>70,"Pass","Fail"). More than one condition can be tested by nesting IF functions. The IF function can be combined with logical functions like AND and OR.

Purpose:

Test for a specific condition

Return value:

The values you supply for TRUE or FALSE

Syntax:

=IF (logical_test, [value_if_true], [value_if_false])

D6		✕ ✓ f_x		=IF(C6>=70,"Pass","Fail")		
	A	B	C	D	E	F
1						
2	IF function					
3	Run a test. Return one result if TRUE, another if FALSE.					
4						
5		Name	Score	Result		
6		Anderson	92	Pass		
7		Bautista	85	Pass		
8		Block	65	Fail		
9		Burrows	79	Pass		
10		Chandler	69	Fail		
11		Colby	95	Pass		
12		Crosby	90	Pass		
13		Dove	70	Pass		
14		Frantz	96	Pass		
15		Gonzalez	93	Pass		
16		Humphrey	75	Pass		

Passing score: 70

Arguments:

logical_test - A value or logical expression that can be evaluated as TRUE or FALSE.

value_if_true - [optional] The value to return when logical_test evaluates to TRUE.

value_if_false - [optional] The value to return when logical_test evaluates to FALSE.

AND Function

Summary:

The Excel AND function is a logical function used to require more than one condition at the same time. AND returns either TRUE or FALSE. To test if a number in A1 is greater than zero and less than 10, use =AND(A1>0,A1<10). The AND function can be used as the logical test inside the IF function to avoid extra nested IFs, and can be combined with the OR function.

Purpose:

Test multiple conditions with AND

Return value :

TRUE if all arguments evaluate TRUE; FALSE if not

Syntax :

=AND (logical1, [logical2], ...)

C5		fx		=AND(B5>75,B5<90)		
	A	B	C	D	E	F
1	AND function					
2	Return TRUE if all conditions are TRUE					
3						
4	Score		>75 AND <90			
5		76	TRUE			
6		81	TRUE			
7		78	TRUE			
8		90	FALSE			
9		85	TRUE			
10		100	FALSE			
11						
12						

Arguments:

logical1 - The first condition or logical value to evaluate.

logical2 - [optional] The second condition or logical value to evaluate.

OR Function

Summary:

The OR function is a logical function to test multiple conditions at the same time. OR returns either TRUE or FALSE. For example, to test A1 for either "x" or "y", use =OR(A1="x",A1="y"). The OR function can be used as the logical test inside the IF function to avoid extra nested IFs, and can be combined with the AND function.

Purpose:

Test multiple conditions with OR

Return value:

TRUE if any arguments evaluate TRUE; FALSE if not.

Syntax:

=OR (logical1, [logical2], ...)

C5		fx =OR(B5="green",B5="red")				
	A	B	C	D	E	F
1	OR function					
2	Return TRUE if any condition is TRUE					
3						
4						
5						
6						
7						
8						
9						
10						
11						

Color	Green OR Red
Red	TRUE
Blue	FALSE
Green	TRUE
Red	TRUE
Blue	FALSE
Green	TRUE

Arguments:

logical1 - The first condition or logical value to evaluate.

logical2 - [optional] The second condition or logical value to evaluate.

IFERROR Function

Summary:

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.

Purpose:

Trap and handle errors

Return value:

The value you specify for error conditions.

Syntax:

=IFERROR (value, value_if_error)

D7		fx		=IFERROR(B7/C7,0)																										
	A	B	C	D	E	F																								
1																														
2	IFERROR(value, value_if_error)																													
3	Trap error and display a more friendly result																													
4																														
5	<table><tr><th>Sales</th><th>Units</th><th>Average price</th><th>Comments</th></tr><tr><td>300</td><td>62</td><td>4.84</td><td></td></tr><tr><td>14</td><td>0</td><td>0.00</td><td>< Would display #DIV/0</td></tr><tr><td>200</td><td>11</td><td>18.18</td><td></td></tr><tr><td>120</td><td>7</td><td>17.14</td><td></td></tr><tr><td>634</td><td>80</td><td>7.93</td><td></td></tr></table>						Sales	Units	Average price	Comments	300	62	4.84		14	0	0.00	< Would display #DIV/0	200	11	18.18		120	7	17.14		634	80	7.93	
Sales	Units	Average price	Comments																											
300	62	4.84																												
14	0	0.00	< Would display #DIV/0																											
200	11	18.18																												
120	7	17.14																												
634	80	7.93																												
6																														
7																														
8																														
9																														
10																														
11																														
12																														

Arguments:

value - The value, reference, or formula to check for an error.

value_if_error - The value to return if an error is found.

AVERAGEIF Function

Summary:

The Excel AVERAGEIF function computes the average of the numbers in a range that meet the supplied criteria. The criteria for AVERAGEIF supports logical operators (>,<,<>=) and wildcards (*,?) for partial matching.

Purpose:

Get the average of numbers that meet criteria

Return value:

A number representing the average.

Syntax:

=AVERAGEIF (range, criteria, [average_range])

H6		fx		=AVERAGEIF(prices,">0")				
	A	B	C	D	E	F	G	H
3	Average cells that meet multiple criteria							
4								
5		Address	Price	Beds	Baths		Criteria	Average
6		3007 Arthur Ave	\$0	2	1		> \$0	\$359,867
7		2479 North Rd	\$109,900	1	1		> 200k	\$501,933
8		4318 D Street	\$112,000	2	1		2+ beds	\$368,443
9		4883 Hartland Ave	\$129,900	1	1			
10		4150 Richland Ave	\$149,900	2	1		Name	Range
11		2659 Crestview Ln	\$189,000	3	2		prices	=C\$6:C\$21
12		1233 Green Ave	\$189,900	3	2		beds	=D\$6:D\$22
13		1448 Cheno Dr	\$229,900	4	2			
14		1301 Robb Ct	\$355,000	3	2			

Arguments:

range - One or more cells, including numbers or names, arrays, or references.

criteria - A number, expression, cell reference, or text.

average_range - [optional] The cells to average. When omitted, range is used.

AVERAGEIFS Function

Summary:

The Excel AVERAGEIFS function calculates the average of numbers in a range that meet one or more supplied criteria. The criteria in AVERAGEIFS supports logical operators (>,<,<=>=) and wildcards (*,?) for partial matching.

Purpose:

Average cells that match multiple criteria

Return value:

The average of the cells that meet all criteria

Syntax:

```
=AVERAGEIFS (avg_rng, range1, criteria1,  
[range2], [criteria2], ...)
```

Arguments:

avg_rng - The range to average.

range1 - The first range to evaluate.

criteria1 - The criteria to use on range1.

range2 - [optional] The second range to evaluate.

criteria2 - [optional] The criteria to use on range2.

H6 =AVERAGEIFS(prices,prices,">0",prices,"<500000")

	A	B	C	D	E	F	G	H
1								
2		AVERAGEIFS Function						
3		AVERAGEIFS (average_range, range1, criteria1, [range2, criteria2])						
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								

Address	Price	Beds	Baths
3007 Arthur Ave	\$0	2	1
2479 North Rd	\$109,900	1	1
4318 D Street	\$112,000	2	1
4883 Hartland Ave	\$129,900	1	1
4150 Richland Ave	\$149,900	2	1
1233 Green Ave	\$189,900	3	2
1448 Cheno Dr	\$229,900	4	2
966 Trainer Rd	\$439,900	3	2
396 Coburn Rd	\$539,900	4	2
1780 Tent Ave	\$589,900	4	3

Criteria	Average
> \$0 and < \$500k	\$194,486
2+ beds and >1 baths	\$397,900
> \$0	\$276,800

prices = C6:C15

beds = D6:D15

baths = E6:E15

DATE Function

Summary:

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.

Purpose:

Create a date with year, month, and day

Return value:

A valid Excel date

Syntax:

=DATE (year, month, day)

E5					=DATE(B5,C5,D5)
	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

DATE (year,month,day)

Year	Month	Day	Result
2019	1	1	1-Jan-19
2019	1	5	5-Jan-19
2019	2	15	15-Feb-19
2019	1	60	1-Mar-19
2019	36	1	1-Dec-21
2019	1	-1	30-Dec-18

Arguments:

year - Number for year.

month - Number for month.

day - Number for day.

DAY Function

Summary:

The Excel DAY function returns the day of the month as a number between 1 to 31 from a given date. You can use the DAY function to extract a day number from a date into a cell. You can also use the DAY function to extract and feed a day value into another function.

Purpose:

Get the day as a number (1-31) from a date

Return value:

A number (1-31) representing the day component in a date.

Syntax:

=DAY (date)

C5						
	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						

DAY (date)

Date	Result
1-Jan-2013	1
1-Jun-1970	1
4-Jul-2013	4
30-Sep-2015	30
24-Sep-2018	24
7-Apr-2025	7

Arguments:

date - A valid Excel date.

DAYS Function

Summary:

The Excel DAYS function returns the number of days between two dates. With a start date in A1 and end date in B1, =DAYS(B1,A1) will return the days between the two dates.

Purpose:

Get days between dates

Return value:

A number representing days.

Syntax:

=DAYS (end_date, start_date)

D5	:	X	✓	fx	=DAYS(B5,C5)																	
	A	B	C	D	E	F	G															
1	DAYS (end_date, start_date)																					
2	Get days between two dates, ignoring time																					
3																						
4	<table> <tr> <th>End</th><th>Start</th><th>Result</th></tr> <tr> <td>1/1/2017</td><td>1/1/2016</td><td>366</td></tr> <tr> <td>1/1/2016</td><td>1/1/2015</td><td>365</td></tr> <tr> <td>7/10/2016</td><td>7/1/2016</td><td>9</td></tr> <tr> <td>12/31/2016</td><td>9/15/2016</td><td>107</td></tr> </table>							End	Start	Result	1/1/2017	1/1/2016	366	1/1/2016	1/1/2015	365	7/10/2016	7/1/2016	9	12/31/2016	9/15/2016	107
End	Start	Result																				
1/1/2017	1/1/2016	366																				
1/1/2016	1/1/2015	365																				
7/10/2016	7/1/2016	9																				
12/31/2016	9/15/2016	107																				
5																						
6																						
7																						
8																						
9																						
10																						

Arguments:

end_date - The end date.

start_date - The start date.

MINUTE Function

Summary:

The Excel MINUTE function extracts the minute component of a time as a number between 0-59. For example, with a time of 9:45 AM, minute will return 45. You can use the MINUTE function to extract the minute into a cell, or feed the result into another function.

Purpose:

Get minute as a number (0-59) from time

Return value:

Number between 0 and 59.

Syntax:

=MINUTE (serial_number)

C6						
	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

MINUTE (serial_number)
Extract minute from date or time

Time	Result	
9:15 AM	15	<-- hour is ignored
9:30 AM	30	
9:45 AM	45	
10:00 AM	0	<-- zero on the hour
10:15 AM	15	
7/1/15 6:23 PM	23	<-- date is ignored
90:00	30	<-- resets after 60 minutes

Arguments:

serial_number - A valid date or time.

TIME Function

Summary:

The Excel TIME function is a built-in function that allows you to create a time with individual hour, minute, and second components. The TIME function is useful when you want to assemble a proper time inside another formula.

Purpose:

Create a time with hours, minutes, and seconds

Return value:

A decimal number representing a particular time in Excel.

Syntax:

=TIME (hour, minute, second)

E4		fx		=TIME(B4,C4,D4)		
	A	B	C	D	E	F
1	TIME (hour, minute, second)					
2						
3						
4		8	0	0	8:00:00 AM	
5		12	30	0	12:30:00 PM	
6		24	0	-1	11:59:59 PM	Negative values OK
7		6	75	0	7:15:00 AM	Values will rollover as needed
8						
9						
10	Returns values from 0 (zero) to 0.99999999 = times from 0:00:00 to 23:59:59.					
11						

Arguments:

hour - The hour for the time you wish to create.

minute - The minute for the time you wish to create.

second - The second for the time you wish to create.

MONTH Function

Summary:

The Excel MONTH function extracts the month from a given date as number between 1 to 12. You can use the MONTH function to extract a month number from a date into a cell, or to feed a month number into another function.

Purpose:

Get month as a number (1-12) from a date

Return value:

A number between 1 and 12.

Syntax:

=MONTH (date)

C6					
	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

MONTH (date)
Extract month number from date

Date	Result
10-Oct-2015	10
17-May-2018	5
30-Nov-2018	11
15-Feb-2019	2
30-Mar-2019	3
20-Sep-2019	9
30-Mar-2020	3
3-Dec-2021	12

Arguments:

date - A valid Excel date.

YEAR Function

Summary:

The Excel YEAR function returns the year component of a date as a 4-digit number. You can use the YEAR function to extract a year number from a date into a cell or to extract and feed a year value into another formula.

Purpose:

Get the year from a date

Return value:

Year as 4-digit number

Syntax:

=YEAR (date)

C6					
	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

YEAR (date)
Extract year number from date

Date	Result
10-Oct-1964	1964
17-May-1970	1970
30-Nov-1981	1981
15-Feb-1987	1987
30-Mar-1998	1998
20-Sep-2000	2000
30-Mar-2012	2012
24-Jun-2019	2019

Arguments:

date - A valid Excel date.

VLOOKUP Function

Summary:

VLOOKUP is an Excel function to lookup and retrieve data from a specific column in table. VLOOKUP supports approximate and exact matching, and wildcards (* ?) for partial matches. The "V" stands for "vertical". Lookup values must appear in the first column of the table, with lookup columns to the right.

Purpose:

Lookup a value in a table by matching on the first column

Return value:

The matched value from a table.

Syntax:

=VLOOKUP (value, table, col_index, [range_lookup])

The screenshot shows an Excel spreadsheet with the formula bar at the top displaying `=VLOOKUP(D4,B8:F17,4,FALSE)`. The spreadsheet contains a table of employee data starting at row 8, column B. Handwritten annotations include: 'Lookup value' with an arrow pointing to cell D4 (622); 'Result' with an arrow pointing to cell E4 (j.adder@ace.com); and 'Lookup column' with an arrow pointing from the ID column (B8) to the 'Result column' (E4). The table data is as follows:

ID	First	Last	Email	Department
610	Janet	Farley	j.farley@ace.com	Fulfillment
798	Steven	Batista	s.batista@ace.com	Sales
841	Evelyn	Monet	e.monet@ace.com	Fulfillment
886	Marilyn	Bradley	m.bradley@ace.com	Fulfillment
622	Jonathan	Adder	j.adder@ace.com	Marketing
601	Adrian	Birt	a.birt@ace.com	Engineering
869	Julie	Irons	j.irons@ace.com	Marketing
867	Erica	Tan	e.tan@ace.com	Fulfillment
785	Harold	Clayton	h.clayton@ace.com	Fulfillment
648	Sharyn	Castor	s.castor@ace.com	Support

Arguments:

value - The value to look for in the first column of a table.

table - The table from which to retrieve a value.

col_index - The column in the table from which to retrieve a value.

range_lookup - [optional] TRUE = approximate match (default).

FALSE = exact match.

HLOOKUP Function

Summary:

HLOOKUP is an Excel function to lookup and retrieve data from a specific row in table. The "H" in HLOOKUP stands for "horizontal", where lookup values appear in the first row of the table, moving horizontally to the right. HLOOKUP supports approximate and exact matching, and wildcards (* ?) for finding partial matches.

Purpose:

Look up a value in a table by matching on the first row

Return value:

The matched value from a table.

Syntax:

=HLOOKUP (value, table, row_index, [range_lookup])

D8									
	A	B	C	D	E	F	G	H	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

HLOOKUP (lookup_value, table_array, row_index_num, range_lookup)

Sales	\$ 50,000	\$ 75,000	\$ 100,000	\$ 125,000	\$ 175,000	\$ 200,000
Comm %	3%	4%	5%	6%	8%	9%

Name	Sales	Comm %	Comm \$
Applebee	\$ 171,900	6%	\$10,314
Bueller	\$ 93,500	4%	\$3,740
Chung	\$ 151,200	6%	\$9,072
Crawford	\$ 119,850	5%	\$5,993
Iovce	\$ 89,450	4%	\$3,578

Arguments:

value - The value to look up.

table - The table from which to retrieve data.

row_index - The row number from which to retrieve data.

range_lookup - [optional] A boolean to indicate exact match or approximate match. Default = TRUE = approximate match.

INDEX Function

Summary:

The Excel INDEX function returns the value at a given position in a range or array. You can use INDEX to retrieve individual values or entire rows and columns. INDEX is often used with the MATCH function, where MATCH locates and feeds a position to INDEX.

Purpose:

Get a value in a list or table based on location

Return value:

The value at a given location.

Syntax:

=INDEX (array, row_num, [col_num], [area_num])

Excel formula bar: G7 fx =INDEX(B5:E13,5,3)

	A	B	C	D	E	F	G	H
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

INDEX(array,row_num,column_num)

	1	2	3	4
	Planet	Position	Diameter	Satelites
1	Mercury	1	5 km	0
2	Venus	2	12 km	0
3	Earth	3	13 km	1
4	Mars	4	7 km	2
5	Jupiter	5	143 km	67
6	Saturn	6	121 km	200
7	Uranus	7	51 km	27
8	Neptune	8	50 km	13

Jupiter's diameter is at row 5, column 3

143 km

Jupiter's diameter

Arguments:

array - A range of cells, or an array constant.

row_num - The row position in the reference or array.

col_num - [optional] The column position in the reference or array.

area_num - [optional] The range in reference that should be used.

MATCH Function

Summary:

MATCH is an Excel function used to locate the position of a lookup value in a row, column, or table. MATCH supports approximate and exact matching, and [wildcards](#) (* ?) for partial matches. Often, the INDEX function is combined with MATCH to retrieve the value at the position returned by MATCH.

Purpose:

Get the position of an item in an array

Return value:

A number representing a position in lookup_array.

Syntax:

=MATCH (lookup_value, lookup_array, [match_type])

Formula Bar: `=MATCH(E5,fruits,0)`

Spreadsheet Data:

	A	B	C	D	E	F	G	H
1								
2			MATCH (lookup_value, lookup_array, match_type)					
3								
4								
5			1 Apple					
6			2 Pear					
7			3 Peach					
8			4 Grape					
9			5 Lemon					
10			6 Lime					
11			7 Kiwi					
12								
13								

fruits = C5:C11

Arguments:

lookup_value - The value to match in lookup_array.

lookup_array - A range of cells or an array reference.

match_type - [optional] 1 = exact or next smallest (default), 0 = exact match, -1 = exact or next largest.

CONCATENATE Function

Summary:

The Excel CONCATENATE function concatenates (joins) join up to 30 text items together and returns the result as text. The CONCAT function replaces CONCATENATE in newer versions of Excel.

Purpose:

Join text together

Return value:

Text joined together.

Syntax:

=CONCATENATE (text1, text2, [text3], ...)

D5				=CONCATENATE(B5," and ",C5)	
	A	B	C	D	E
1					
2	CONCATENATE (text1, text2,...)				
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

Text1	Text2	Result	Formula
Apples	Pears	Apples and Pears	=CONCATENATE(B5," and ",C5)
Beer	Wine	Beer or Wine	=CONCATENATE(B6," or ",C6)
Month:	7/1/2019	Month: July	=CONCATENATE(B7,TEXT(C7,"mmm"))

Arguments:

text1 - The first text value to join together.

text2 - The second text value to join together.

text3 - [optional] The third text value to join together.

DOLLAR Function

Summary:

The Excel DOLLAR function converts a number to text using the Currency number format. The TEXT function can do the same thing, and is much more versatile.

Purpose:

Convert a number to text in currency format

Return value:

A number as text in currency format.

Syntax:

=DOLLAR (number, decimals)

C4		fx		=DOLLAR(B4)	
	A	B	C	D	E
1	DOLLAR (number, [decimals])				
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

Number	Result	Notes
110.25	\$110.25	Default is two decimal places
110.25	\$110	Zero decimal places
110.25	\$100	-2 decimal places
110.25	\$110.25	Using TEXT instead of DOLLAR

Note: TEXT is more flexible than DOLLAR

Arguments:

number - The number to convert.

decimals - The number of digits to the right of the decimal point. Default is 2.

EXACT Function

Summary:

The Excel EXACT function compares two text strings, taking into account upper and lower case characters, and returns TRUE if they are the same, and FALSE if not. EXACT is case-sensitive.

Purpose:

Compare two text strings

Return value:

A boolean value (TRUE or FALSE)

Syntax:

=EXACT (text1, text2)

D6							
	A	B	C	D	E	F	G
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							

EXACT function
EXACT (text1, text2)

Text 1	Text 2	Result
Apple	Apple	TRUE
Apple	apple	FALSE
ABC123	ABC123	TRUE
123	123	TRUE
A stitch in time	A stitch in time	TRUE
A stitch in time	A stitch in Time	FALSE

Arguments:

text1 - The first text string to compare.

text2 - The second text string to compare.

LEFT Function

Summary:

The Excel LEFT function extracts a given number of characters from the left side of a supplied text string. For example, LEFT("apple",3) returns "app".

Purpose:

Extract text from the left of a string

Return value:

One or more characters.

Syntax:

=LEFT (text, [num_chars])

C5		fx		=LEFT(B5,3)		
	A	B	C	D	E	F
1						
2	LEFT (text)					
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Text	Result	Comment
New York City	New	Left 3 characters of "New York"
New York City	New York	Left 8 characters of "New York"
84111-0001	84111	Standard 5 digits of a zip code
303-512-4271	303	Area code of a phone number

Arguments:

text - The text from which to extract characters.

num_chars - [optional] The number of characters to extract, starting on the left side of text. Default = 1.

RIGHT Function

Summary:

The Excel RIGHT function extracts a given number of characters from the right side of a supplied text string. For example, RIGHT("apple",3) returns "ple".

Purpose:

Extract text from the right of a string

Return value:

One or more characters.

Syntax:

=RIGHT (text, [num_chars])

E4		fx		=RIGHT(B4,4)	
	A	B	C	D	E
1	RIGHT (text)				
2					
3		Text		Examples	
4		New York City		Right 4 characters of "New York City"	City
5		Moab, UT		State abbreviation from city, state	UT
6		FUNCTION		Number of characters not specified	N
7		303-512-4271		Phone number without area code	512-4271
8		google.com		Extracting a 3 letter domain extension	com
9					
10					
11					

Arguments:

text - The text from which to extract characters on the right.

num_chars - [optional] The number of characters to extract, starting on the right. Optional, default = 1.

MID Function

Summary:

The Excel MID function extracts a given number of characters from the middle of a supplied text string. For example, =MID("apple",2,3) returns "ppl".

Purpose:

Extract text from inside a string

Return value:

The characters extracted.

Syntax:

=MID (text, start_num, num_chars)

E4		fx		=MID(B4,C4,D4)	
	A	B	C	D	E
1	MID (text, start_num, num_chars)				
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

Text	Start	Chars	Result	Notes
The cat in the hat	5	3	cat	Retrieving characters 5-7
The cat in the hat	16	3	hat	Retrieving characters 16-18
string_unwanted	1		string	Using FIND with MID to remove "_xxxx"
string_garbage	1		string	Same formula as above

Arguments:

text - The text to extract from.

start_num - The location of the first character to extract.

num_chars - The number of characters to extract.

UPPER Function

The Excel UPPER function returns a upper-case version of a given text string. Numbers and punctuation are not affected.

Purpose:


Convert text to upper case

Return value:

Uppercase text.

Syntax:

=UPPER (text)

C4		fx		=UPPER(B4)	
	A	B	C	D	
1	UPPER (text)				 (Ctrl) ▼
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

Input	Result	Notes
zachary taylor	ZACHARY TAYLOR	Spaces are unaffected
zip code: 84111	ZIP CODE: 84111	Numbers are unaffected
#hello_world!	#HELLO_WORLD!	Punctuation is unaffected

Arguments:

text - The text thatto convert to upper case.

LOWER Function

Summary:

The Excel LOWER function returns a lower-case version of a given text string. Numbers and punctuation are not affected.

Purpose:

Convert text to lower case

Return value:

Text in lower case.

Syntax:

=LOWER (text)

C4		fx =LOWER(B4)	
A	B	C	D
1	LOWER (text)		
2			
3			
4	ZACHARY TAYLOR	zachary taylor	Spaces are unaffected
5	ZIP CODE: 84111	zip code: 84111	Numbers are unaffected
6	#HELLO_World!	#hello_world!	Punctuation is unaffected
7			
8			
9			
10			
11			

Arguments:

text - The text that should be converted to lower case.

PROPER Function

Summary:

The Excel PROPER function capitalizes words given text string. Numbers and punctuation are not affected.

Purpose:

Capitalize the first letter in each word

Return value:

Text in proper case.

Syntax:

=PROPER (text)

C4		fx =PROPER(B4)	
	A	B	C
1	PROPER (text)		
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			

Input	Result	Notes
zachary taylor	Zachary Taylor	Spaces are unaffected
To be or not to be	To Be Or Not To Be	All words are capitalized
san diego, CA	San Diego, Ca	Existing capitalization may be affected

Arguments:

text - The text that should be converted to proper case.

REPLACE Function

Summary:

The Excel REPLACE function replaces characters specified by location in a given text string with another text string. For example
`=REPLACE("XYZ123",4,3,"456")` returns "XYZ456".

Purpose:

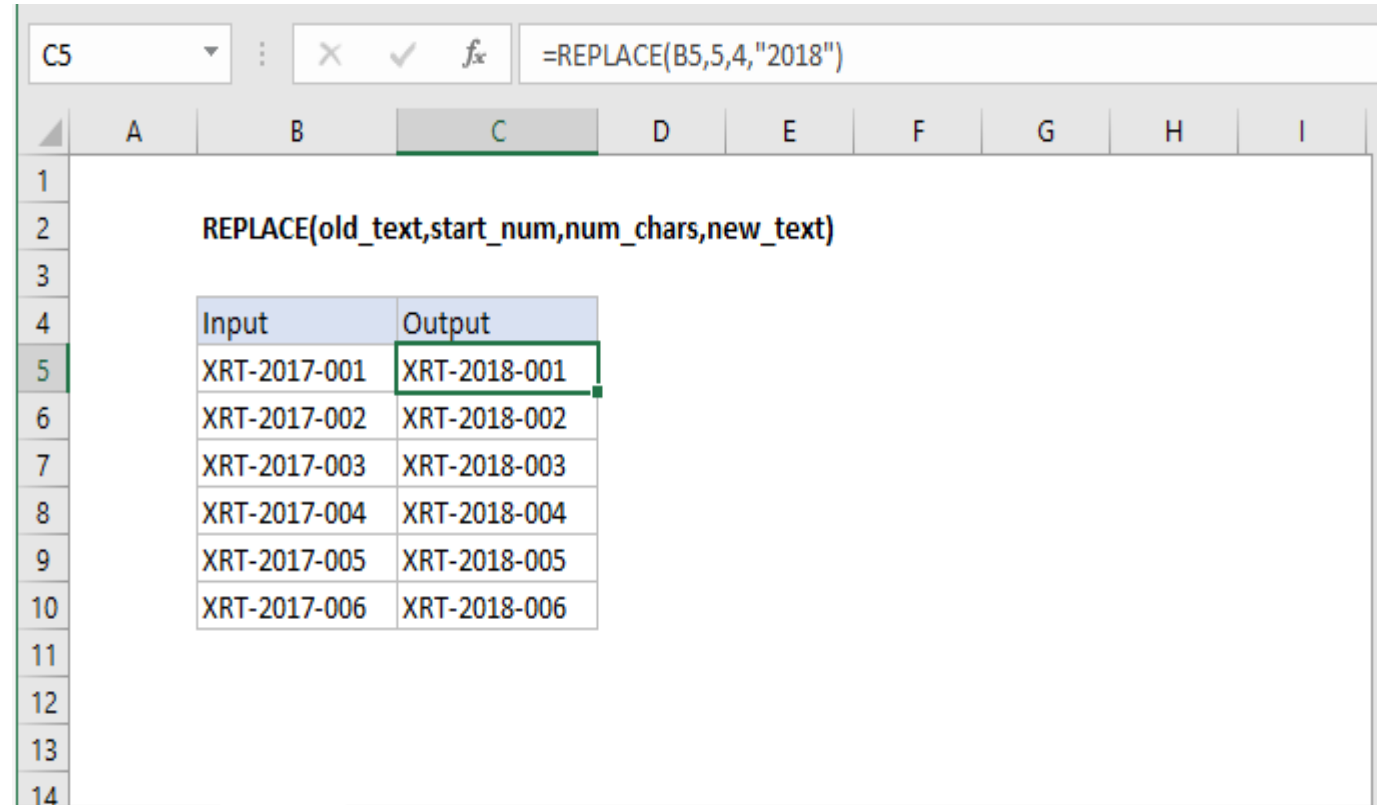
Replace text based on location

Return value:

The altered text.

Syntax:

`=REPLACE (old_text, start_num, num_chars, new_text)`



The screenshot shows an Excel spreadsheet with the formula bar at the top displaying `=REPLACE(B5,5,4,"2018")`. Below the formula bar, the spreadsheet grid shows columns A through I and rows 1 through 14. In row 2, the formula `REPLACE(old_text,start_num,num_chars,new_text)` is entered. Below this, a table is shown with two columns: 'Input' and 'Output'. The table contains six rows of data, where the 'Input' column lists codes from 'XRT-2017-001' to 'XRT-2017-006' and the 'Output' column lists the corresponding codes with '2018' replacing '2017'.

Input	Output
XRT-2017-001	XRT-2018-001
XRT-2017-002	XRT-2018-002
XRT-2017-003	XRT-2018-003
XRT-2017-004	XRT-2018-004
XRT-2017-005	XRT-2018-005
XRT-2017-006	XRT-2018-006

Arguments:

old_text - The text to replace.

start_num - The starting location in the text to search.

num_chars - The number of characters to replace.

new_text - The text to replace old_text with.

REPT Function

Summary:

The Excel REPT function repeats characters a given number of times. For example, =REPT("x",5) returns "xxxxx".

Purpose:

Repeat text as specified

Return value:

The repeated text.

Syntax:

=REPT (text, number_times)

D5					
	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

REPT (text, number_times)

Text	Times	Result
-	5	-----
*	3	***
9	4	9999
z	5	zzzzz
xo	6	xoxoxoxoxo
apple	2	appleapple

Arguments:

text - The text to repeat.

number_times - The number of times to repeat text.

TRIM Function

Summary:

The Excel TRIM function strips extra spaces from text, leaving only a single space between words and no space characters at the start or end of the text.

Purpose:

Remove extra spaces from text

Return value:

Text with extra spaces removed.

Syntax:

=TRIM (text)

C4

fx

=TRIM(B4)

	A	B	C	D
1	<h2>TRIM (text)</h2>			
2				
3				
4		many spaces	many spaces	Extra spaces are replaced with one space
5		even more space	even more space	Leading and trailing spaces also removed
6		extra spaces & line breaks	extra spaces & line breaks	TRIM with CLEAN to remove line breaks and spaces at the same time

Arguments:

text - The text from which to remove extra space.

TEXT Function

Summary:

The Excel TEXT function returns a number in a given number format, as text. You can use the TEXT function to embed formatted numbers inside text.

Purpose:

Convert a number to text in a number format

Return value:

A number as text in the given format.

Syntax:

=TEXT (value, format_text)

C4		=TEXT(B4,"dddd, mmmm dd")	
A	B	C	D
1	TEXT (value, format_text)		
2			
3	Value	Result	Notes
4	12/17/2013	Tuesday, December 17	Custom date format
5	100.00	\$100.00	Currency format
6	1-Apr-14	Register by Tuesday, Apr 1, 2014!	Format a date to use in a text message
7	25%	Profits are up by 25% this year.	Format a number to use in a text message
8			
9			
10			
11			

Arguments:

value - The number to convert.

format_text - The number format to use.

LEN Function

Summary:

The Excel LEN function returns the length of a given text string as the number of characters. LEN will also count characters in numbers, but number formatting is not included.

Purpose:

Get the length of text.

Return value:

Number of characters

Syntax:

=LEN (text)

E4		fx		=LEN(B4)		
	A	B	C	D	E	F
1	LEN(text)					
2						
3		Text		Examples		
4		Utah		Length of "Utah"	4	
5		Salt Lake City		Length of "Salt Lake City"	14	
6		UT		Length of "UT"	2	
7		01-Jan-13		Length of a date (5-digit number)	5	
8		001		Length of "001" (text)	3	
9		10.1		Length of a number (10.00)	4	
10		1,000		Length of a number (1000)	4	
11						

Arguments:

text - The text for which to calculate length.

SUBSTITUTE Function

Summary:

The Excel SUBSTITUTE function replaces text in a given string by matching. For example `=SUBSTITUTE("952-455-7865","-","")` returns "9524557865"; the dash is stripped. SUBSTITUTE is case-sensitive and does not support wildcards.

Purpose:

Replace text based on content

Return value:

The processed text

Syntax:

`=SUBSTITUTE (text, old_text, new_text, [instance])`

C6

✖

✔

f_x

=SUBSTITUTE(B6,"t","b")

	A	B	C	D	E
1					
2	SUBSTITUTE function				
3	SUBSTITUTE (text, old_text,new_text, [instance_num])				
4					
5					
6					
7					
8					
9					
10					
11					
12					

Arguments:

text - The text to change.

old_text - The text to replace.

new_text - The text to replace with.

instance - [optional] The instance to replace. If not supplied, all instances are replaced.

PMT Function

Summary:

The Excel PMT function is a financial function that returns the periodic payment for a loan. You can use the NPER function to figure out payments for a loan, given the loan amount, number of periods, and interest rate.

Purpose:

Get the periodic payment for a loan

Return value:

loan payment as a number

Syntax:

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

C10		fx		=PMT(C6/12,C7,-C5)	
	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

PMT (rate, nper, pv, [fv], [type])
Using PMT to determine loan payment amount

Loan amount	\$5,000
Interest rate	4.50%
Periods (term in months)	60
Compounding periods per year	12
Monthly payment	\$93.22

Arguments:

rate - The interest rate for the loan.

nper - The total number of payments for the loan.

pv - The present value, or total value of all loan payments now.

fv - [optional] The future value, or a cash balance you want after the last payment is made. Defaults to 0 (zero).

type - [optional] When payments are due. 0 = end of period. 1 = beginning of period. Default is 0.

PPMT Function

Summary:

The Excel PPMT function can be used to calculate the principal portion of a given loan payment. For example, you can use PPMT to get the principal amount of a payment for the first period, the last period, or any period in between.

Purpose:

Get principal payment in given period

Return value:

The principal payment

Syntax:

=PPMT (rate, per, nper, pv, [fv], [type])

C11		fx		=PPMT(C6/12,1,C8,-C5)	
	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

PPMT (rate, per, nper, pv, [fv], [type])

Get the principal amount of payment for a given period

Loan amount	\$5,000
Interest rate	4.50%
Monthly payment	\$93.22
Periods (term in months)	60
Compounding periods per year	12

Principal amount in period 1	\$74.47
------------------------------	---------

Arguments:

- rate** - The interest rate per period.
- per** - The payment period of interest.
- nper** - The total number of payments for the loan.
- pv** - The present value, or total value of all payments now.
- fv** - [optional] The cash balance desired after last payment is made. Defaults to 0.
- type** - [optional] When payments are due. 0 = end of period. 1 = beginning of

CELL Function

Summary:

The Excel CELL function returns information about a cell in a worksheet. The type of information to be returned is specified as `info_type`. CELL can get things like address and filename, as well as detailed info about the formatting used in the cell. See below for a full list of information available.

Purpose:

Get information about a cell

Return value:

A text value

Syntax:

`=CELL (info_type, [reference])`

D3		fx		=CELL(C3,B3)		
	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Example	Info type	Result	Notes
\$100.00	address	\$B\$3	
\$100.00	row	4	
\$100.00	col	2	
\$100.00	format	C2	
\$100.00	contents	100	
\$100.00	type	v	
	type	b	
\$100.00	width	16	rounded to nearest integer
apple	prefix	^	

Arguments:

info_type - The type of information to return about the reference.

reference - [optional] The reference from which to extract information.

INFO Function

Summary:

The Excel INFO function returns information about the current environment, including platform, Excel version, number of worksheets in a workbook, and so on. To use the INFO function, supply the type of information you want as text. There are seven types of information available, summarized in the table below.

Purpose:

Get information about current environment

Return value:

The information requested

Syntax:

=INFO (type_text)

C5		fx		=INFO(B5)		
	A	B	C	D	E	F
1	INFO function					
2	Get environment information					
3						
4	Type	Windows result		Mac result		
5	numfile	3		3		
6	directory	C:\Users\dave\Desktop\		HD:Users:dave:Desktop:		
7	origin	\$A:\$A\$1		\$A:\$A\$1		
8	system	pcdos		mac		
9	osversion	Windows (32-bit) NT 6.01		Macintosh (32-bit) 3.10		
10	release	14.0		14.6		
11	recalc	Automatic		Automatic		

Arguments:

type_text - The information type to return as text.

ISBLANK Function

Summary:

The Excel ISBLANK function returns TRUE when a cell contains is empty, and FALSE when a cell is not empty. For example, if A1 contains "apple", ISBLANK(A1) returns FALSE.

Purpose:

Test if a cell is empty

Return value:

A logical value (TRUE or FALSE)

Syntax:

=ISBLANK (value)

C6		fx		=ISBLANK(B6)	
	A	B	C	D	E
1					
2	ISBLANK (value)				
3	Test if a cell is empty				
4					
5					
6					
7					
8					
9					
10					
11					
12					

Values	Result	Notes
Apple	FALSE	
10	FALSE	
	TRUE	Nothing in B8
	FALSE	B9 contains a formula that returns ""

Arguments:

value - The value to check.

ROUNDUP Function

Summary:

The Excel ROUNDUP function returns a number rounded up to a given number of decimal places. Unlike standard rounding, where numbers less than 5 are rounded down, ROUNDUP rounds *all numbers up*.

Purpose:

Round a number up to a given number of digits

Return value:

A rounded number.

Syntax:

=ROUNDUP (number, num_digits)

D5					=ROUNDUP(B5,C5)				
	A	B	C	D	E				
1									
2	ROUNDUP (number, num_digits)								
3									
4		Number	Digits	Result					
5		5.1242	0	6	Round up to nearest whole number				
6		5.1242	1	5.2	Round up to 1 decimal place				
7		5.1242	2	5.13	Round up to 2 decimal places				
8		5.1242	3	5.125	Round up to 3 decimal places				
9		5.1242	4	5.1242	Round up to 4 decimal places				
10		23242.3	-1	23250	Round up to the nearest 10				
11		23242.3	-2	23300	Round up to the nearest 100				
12		23242.3	-3	24000	Round up to the nearest 1000				
13		23242.3	-4	30000	Round up to the nearest 10000				

Arguments:

number - The number to round up.

num_digits - The number of digits to which number should be rounded up.

SUBTOTAL Function

Summary:

The Excel SUBTOTAL function returns an aggregate result for supplied values. SUBTOTAL can return a SUM, AVERAGE, COUNT, MAX, and others (see table below), and SUBTOTAL function can either include or exclude values in hidden rows.

Purpose:

Get a subtotal in a list or database

Return value:

A number representing a specific kind of subtotal

Syntax:

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

C2		fx =SUBTOTAL(3,B5:B14)																																													
	A	B	C	D	E	F	G																																								
1																																															
2	Items visible:			7	Subtotal:		\$9.54																																								
3																																															
4	<table><tr><th>Item</th><th>Category</th><th>Quantity</th><th>Unit price</th><th>Total price</th></tr><tr><td>apples</td><td>Fruit</td><td>12</td><td>\$0.15</td><td>\$1.80</td></tr><tr><td>pears</td><td>Fruit</td><td>6</td><td>\$0.35</td><td>\$2.10</td></tr><tr><td>oranges</td><td>Fruit</td><td>10</td><td>\$0.22</td><td>\$2.20</td></tr><tr><td>plums</td><td>Fruit</td><td>4</td><td>\$0.26</td><td>\$1.04</td></tr><tr><td>banannas</td><td>Fruit</td><td>6</td><td>\$0.12</td><td>\$0.72</td></tr><tr><td>lemons</td><td>Fruit</td><td>3</td><td>\$0.16</td><td>\$0.48</td></tr><tr><td>limes</td><td>Fruit</td><td>6</td><td>\$0.20</td><td>\$1.20</td></tr></table>							Item	Category	Quantity	Unit price	Total price	apples	Fruit	12	\$0.15	\$1.80	pears	Fruit	6	\$0.35	\$2.10	oranges	Fruit	10	\$0.22	\$2.20	plums	Fruit	4	\$0.26	\$1.04	banannas	Fruit	6	\$0.12	\$0.72	lemons	Fruit	3	\$0.16	\$0.48	limes	Fruit	6	\$0.20	\$1.20
Item	Category	Quantity	Unit price	Total price																																											
apples	Fruit	12	\$0.15	\$1.80																																											
pears	Fruit	6	\$0.35	\$2.10																																											
oranges	Fruit	10	\$0.22	\$2.20																																											
plums	Fruit	4	\$0.26	\$1.04																																											
banannas	Fruit	6	\$0.12	\$0.72																																											
lemons	Fruit	3	\$0.16	\$0.48																																											
limes	Fruit	6	\$0.20	\$1.20																																											
5																																															
6																																															
7																																															
8																																															
9																																															
10																																															
11																																															
15																																															

Arguments:

function_num - A number that specifies which function to use in calculating subtotals within a list. See table below for full list.

ref1 - A named range or reference to subtotal.

ref2 - [optional] A named range or reference to subtotal.

CHOOSE Function

Summary:

The Excel CHOOSE function returns a value from a list using a given position or index. For example, CHOOSE(2,"red","blue","green") returns "blue", since blue is the 2nd value listed after the index number. The values provided to CHOOSE can include references.

Purpose:

Get a value from a list based on position

Return value:

The value at the given position.

Syntax:

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

C5		fx =CHOOSE(B5,"red","blue","green")												
	A	B	C	D	E	F								
1														
2	CHOOSE function													
3														
4	<table><tr><th>Input</th><th>Output</th></tr><tr><td>1</td><td>red</td></tr><tr><td>2</td><td>blue</td></tr><tr><td>3</td><td>green</td></tr></table>						Input	Output	1	red	2	blue	3	green
Input	Output													
1	red													
2	blue													
3	green													
5														
6														
7														
8														
9														
10														
11														

Arguments:

index_num - The value to choose. A number between 1 and 254.

value1 - The first value from which to choose.

value2 - [optional] The second value from which to choose.

SUMPRODUCT Function

Summary:

The SUMPRODUCT function multiplies ranges or arrays together and returns the sum of products. This sounds boring, but SUMPRODUCT is an incredibly versatile function that can be used to count and sum like COUNTIFS or SUMIFS, but with more flexibility. Other functions can easily be used inside SUMPRODUCT to extend functionality even further.

Purpose:

Multiply, then sum arrays

Return value:

The result of multiplied and summed arrays

Syntax:

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

F6	\sum	=SUMPRODUCT(--(B5:B9="TX"),C5:C9)					
	A	B	C	D	E	F	G
1							
2	SUMPRODUCT function						
3							
4		State	Sales				
5		UT	75				
6		CO	100				
7		TX	125				
8		CO	125				
9		TX	150				
10							
11							
12							

Count TX	2
Sum TX	275

Arguments:

array1 - The first array or range to multiply, then add.

array2 - [optional] The second array or range to multiply, then add.

RANDBETWEEN Function

Summary:

The Excel RANDBETWEEN function returns a random integer between given numbers. RANDBETWEEN recalculates when a worksheet is opened or changed.

Purpose:

Get a random integer between two values

Return value:

An integer

Syntax:

=RANDBETWEEN (bottom, top)

D6							
	A	B	C	D	E	F	G
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							

RANDBETWEEN(bottom,top)

Generate a random number between two numbers

Bottom	Top	Result
1	10	6
1	100	40
1000	1500	1285
-10	10	7
-100	0	-72

Arguments:

bottom - An integer representing the lower value of the range.

top - An integer representing the upper value of the range.

INDIRECT Function

Summary:

The Excel INDIRECT function returns a valid reference from a given text string. Use INDIRECT when you need to convert a reference assembled as text into a proper reference.

Purpose:

Create a reference from text

Return value:

A valid worksheet reference.

Syntax:

=INDIRECT (ref_text, [a1])

C6 fx =INDIRECT(B6&\"!A1\")

Formula Bar

Dynamic worksheet reference with INDIRECT
Dynamic link to A1 in 5 sheets

Sheet	Value
Sheet1	100
Sheet2	200
Sheet3	300
Sheet4	400
Sheet5	500

Arguments:

ref_text - A reference supplied as text.

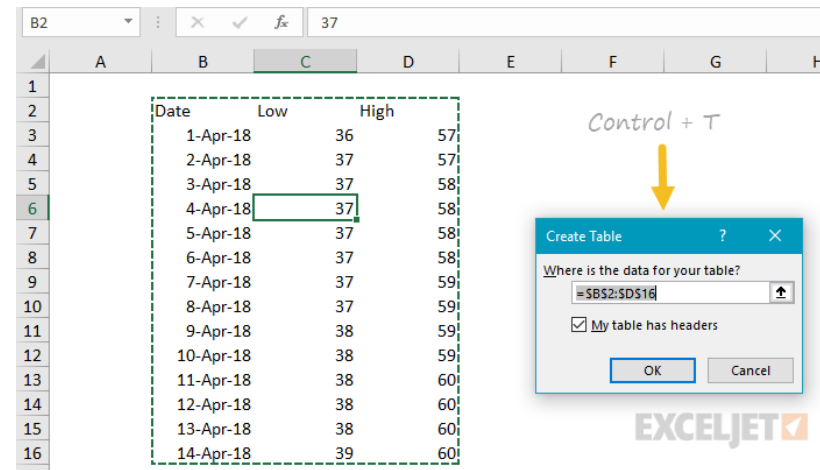
a1 - [optional] A boolean to indicate A1 or R1C1-style reference. Default is TRUE = A1 style.

Excel Tables

Excel Tables have a confusingly generic name, but they are packed with useful features. If you need a range that expands to include new data, and if you want formulas that automatically stay up to date, Excel Tables are for you. This article provides an overview.

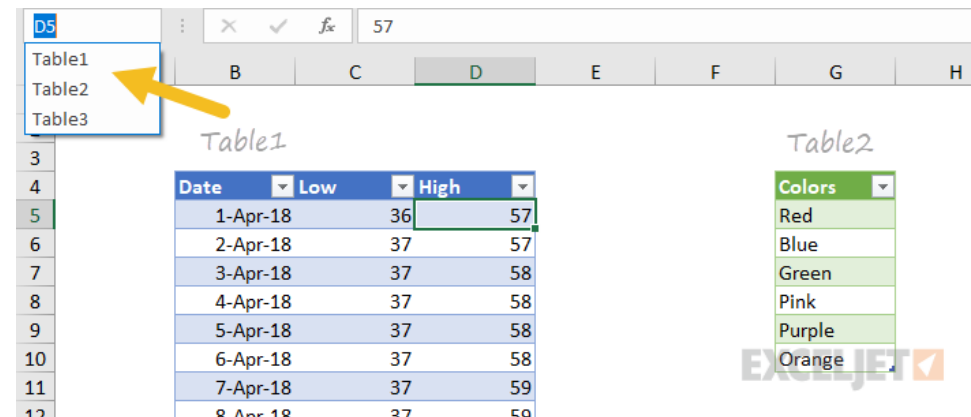
1. Creating a Table is Fast

You can create an Excel Table in less than 10 seconds. First, remove blank rows and make sure all columns have a unique name, then put the cursor anywhere in the data and use the keyboard shortcut Control + T. When you click OK, Excel will create the table.



2. Navigate Directly to Tables

Like [named ranges](#), tables will appear in the namebox dropdown menu. Just click the menu, and select the table. Excel will navigate to the table, even if it's on a different tab in a workbook.



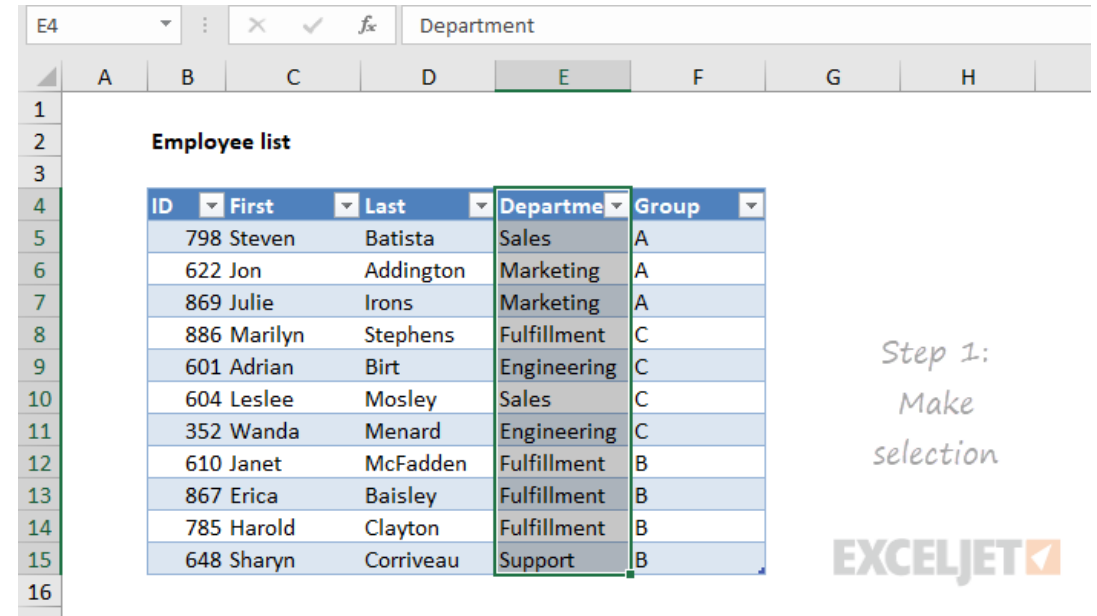
3. Tables Provide Special Shortcuts

When you convert regular data to an Excel Table, almost every shortcut you know works better. For example, you can select rows with shift + space, and columns with control + space. These shortcuts make selections that run precisely to the edge of the table, even when you can't see the edge of the table. Watch the video below for a quick rundown.

4. Painless Drag and Drop

Tables make it much easier to rearrange data with drag and drop. After you've selected a table row or column, simply drag to a new location. Excel will quietly insert the selection at the new location, without complaining about overwriting data.

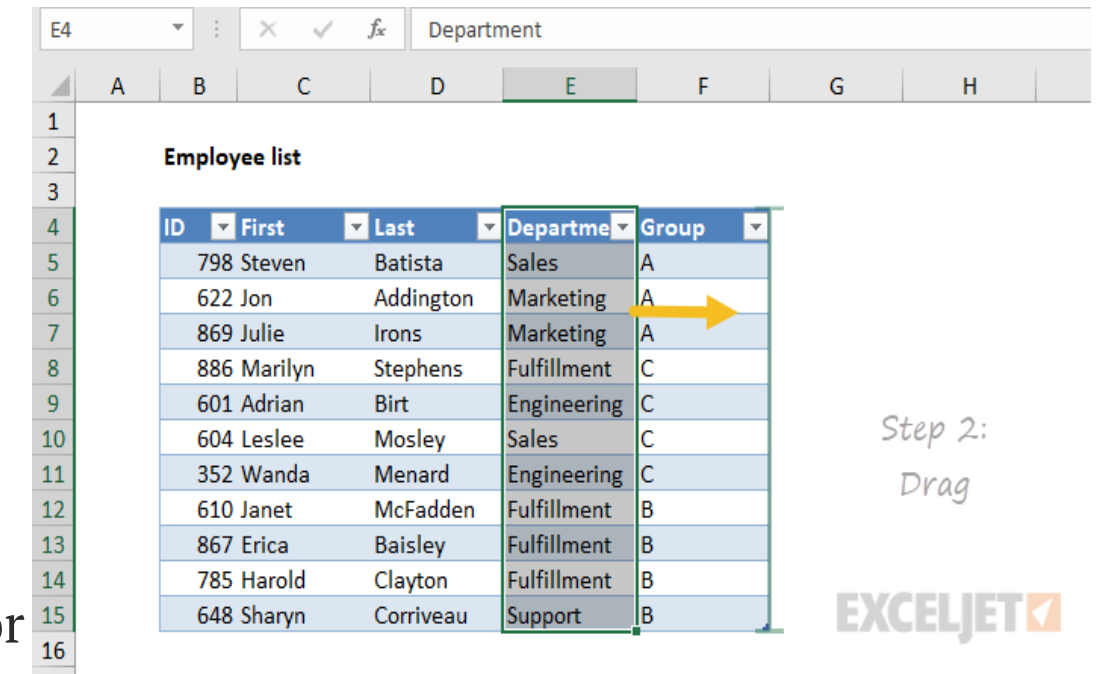
Note: you must select the entire row or column. For columns, that includes the header.



Step 1: Make selection

EXCELJET

ID	First	Last	Department	Group
798	Steven	Batista	Sales	A
622	Jon	Addington	Marketing	A
869	Julie	Irons	Marketing	A
886	Marilyn	Stephens	Fulfillment	C
601	Adrian	Birt	Engineering	C
604	Leslee	Mosley	Sales	C
352	Wanda	Menard	Engineering	C
610	Janet	McFadden	Fulfillment	B
867	Erica	Baisley	Fulfillment	B
785	Harold	Clayton	Fulfillment	B
648	Sharyn	Corriveau	Support	B



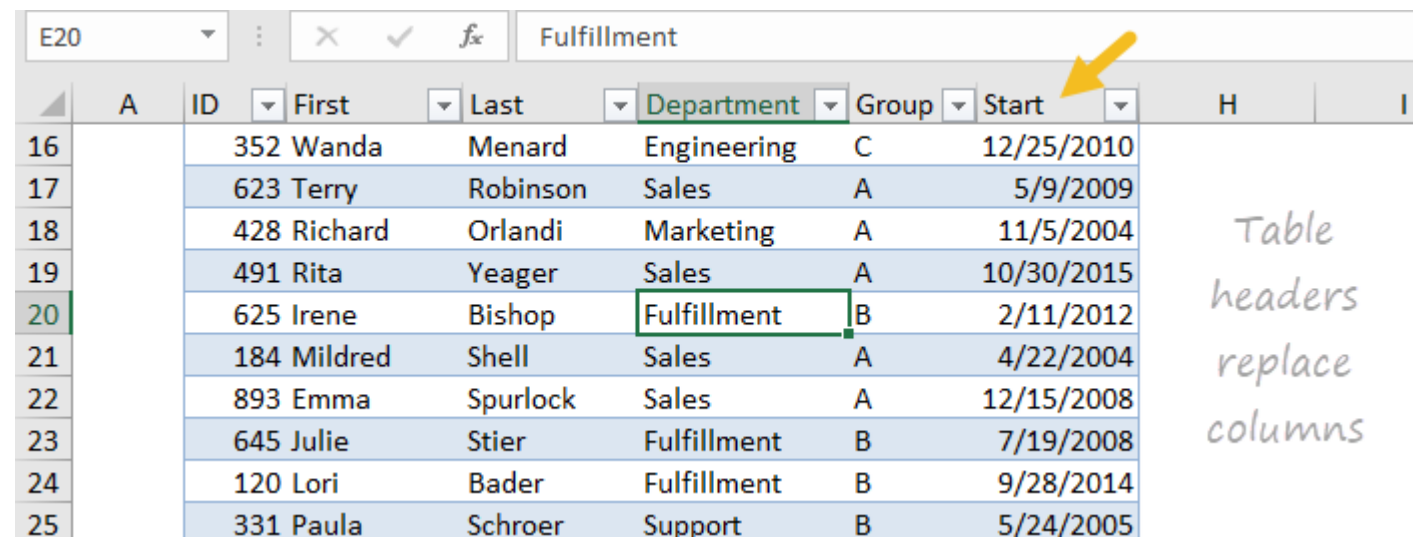
Step 2: Drag

EXCELJET

ID	First	Last	Department	Group
798	Steven	Batista	Sales	A
622	Jon	Addington	Marketing	A
869	Julie	Irons	Marketing	A
886	Marilyn	Stephens	Fulfillment	C
601	Adrian	Birt	Engineering	C
604	Leslee	Mosley	Sales	C
352	Wanda	Menard	Engineering	C
610	Janet	McFadden	Fulfillment	B
867	Erica	Baisley	Fulfillment	B
785	Harold	Clayton	Fulfillment	B
648	Sharyn	Corriveau	Support	B

5. Table Headers Stay Visible

One frustration when working with a large set of data is that table headers disappear as you scroll down the table. Tables solve this problem in a clever way. When column headers scroll off the top of the table, Excel silently replaces worksheet columns with table headers.

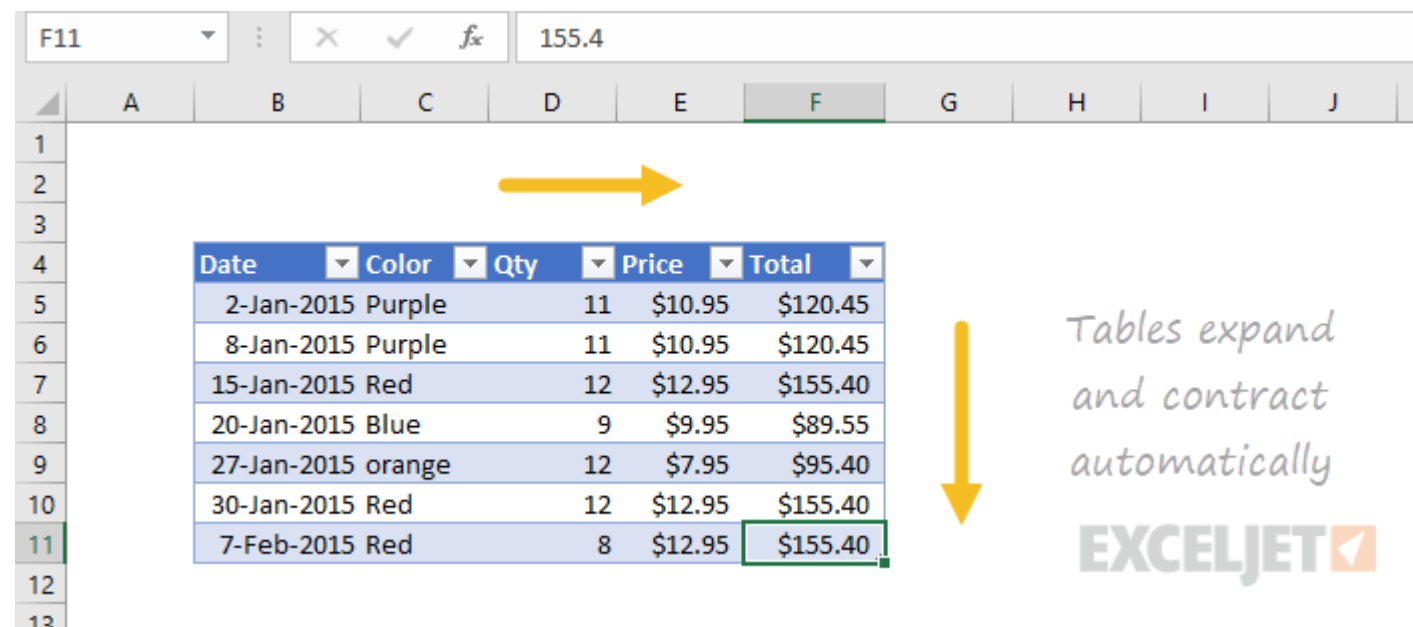


	A	ID	First	Last	Department	Group	Start	H	I
16		352	Wanda	Menard	Engineering	C	12/25/2010		
17		623	Terry	Robinson	Sales	A	5/9/2009		
18		428	Richard	Orlandi	Marketing	A	11/5/2004		
19		491	Rita	Yeager	Sales	A	10/30/2015		
20		625	Irene	Bishop	Fulfillment	B	2/11/2012		
21		184	Mildred	Shell	Sales	A	4/22/2004		
22		893	Emma	Spurlock	Sales	A	12/15/2008		
23		645	Julie	Stier	Fulfillment	B	7/19/2008		
24		120	Lori	Bader	Fulfillment	B	9/28/2014		
25		331	Paula	Schroer	Support	B	5/24/2005		

Table headers replace columns

6. Tables Expand Automatically

When new rows or columns are added to an Excel Table, the table expands to enclose them. In a similar way, a table automatically contracts when rows or columns are deleted. When combined with structured references (see below) this gives you a dynamic range to use with formulas.



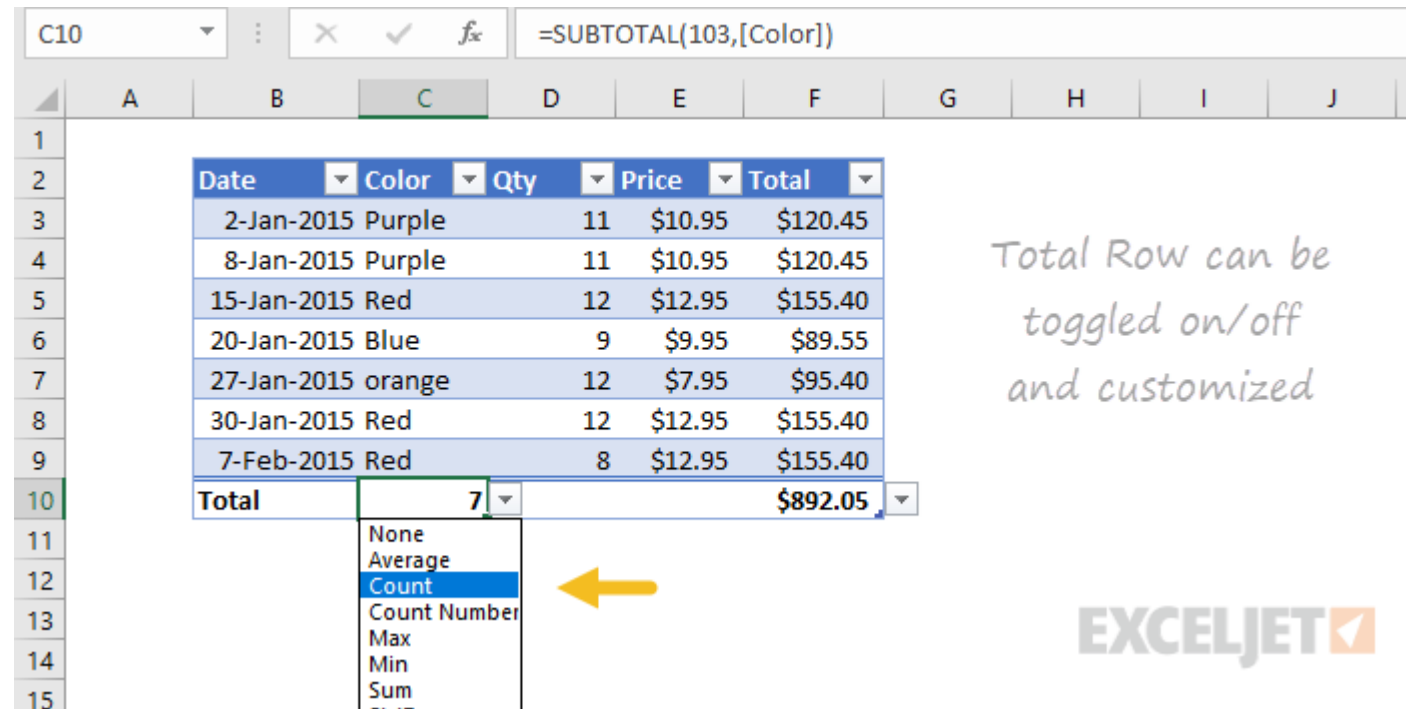
	A	B	C	D	E	F	G	H	I	J
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										

Tables expand and contract automatically

EXCELJET

7. Totals Without Formulas

All tables can display an optional Total Row. The Total Row can be easily configured to perform operations like SUM and COUNT without entering a formula. When the table is filtered, these totals will automatically calculate on visible rows only. You can toggle the Total Row on and off with the shortcut control + shift + T.



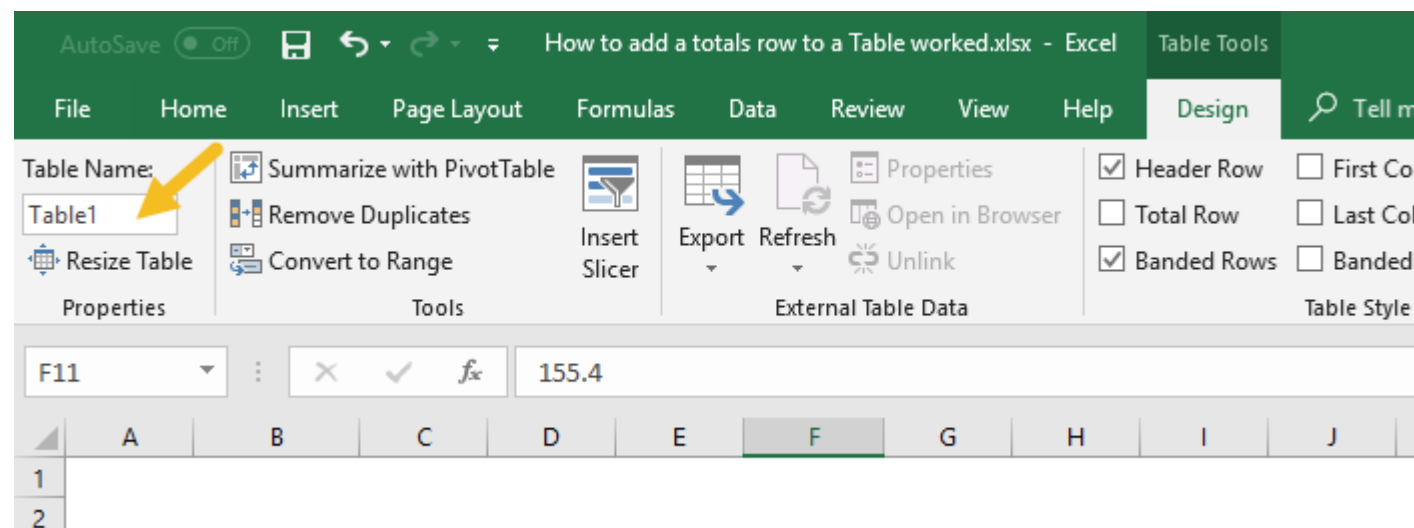
The screenshot shows an Excel table with columns: Date, Color, Qty, Price, and Total. The table contains 7 data rows. The Total Row is highlighted in blue. A dropdown menu is open for the Total Row, showing options: None, Average, Count, Count Number, Max, Min, and Sum. A yellow arrow points to the 'Count' option. The formula bar shows '=SUBTOTAL(103,[Color])'.

Total Row can be toggled on/off and customized

EXCELJET

8. Rename a Table Anytime

All tables are automatically assigned a generic name like Table1, Table2, etc. However, you can rename a table at any time. Select any cell in the table and enter a new name on the Table Tools menu.



The screenshot shows the Excel Table Tools Design tab. The Table Name dropdown is highlighted with a yellow arrow, showing 'Table1'. The table contains 2 data rows. The formula bar shows '155.4'.

9. Fill Formulas Automatically

Tables have a feature called calculated columns that makes entering and maintaining formulas easier and more accurate. When you enter a standard formula in a column, the formula is automatically copied throughout the column, with no need for copy and paste.

F5 X ✓ f_x =[@Total]*6%

1 2 3 4 5 6 7 8 9 10 11 12 13

Calculated Columns

Date	Color	Qty	Price	Total	Tax
2-Jan-2015	Purple	11	\$10.95	\$120.45	=[@Total]*6%
8-Jan-2015	Purple	11	\$10.95	\$120.45	
15-Jan-2015	Red	12	\$12.95	\$155.40	
16-Jan-2015	Pink	17	\$8.85	\$150.45	
20-Jan-2015	Blue	9	\$9.95	\$89.55	
27-Jan-2015	Orange	12	\$7.95	\$95.40	
30-Jan-2015	Red	12	\$12.95	\$155.40	
7-Feb-2015	Red	12	\$12.95	\$155.40	
7-Feb-2015	Purple	11	\$10.95	\$120.45	

Enter formula normally

G6 X ✓ f_x =[@Total]*6%

1 2 3 4 5 6 7 8 9 10 11 12

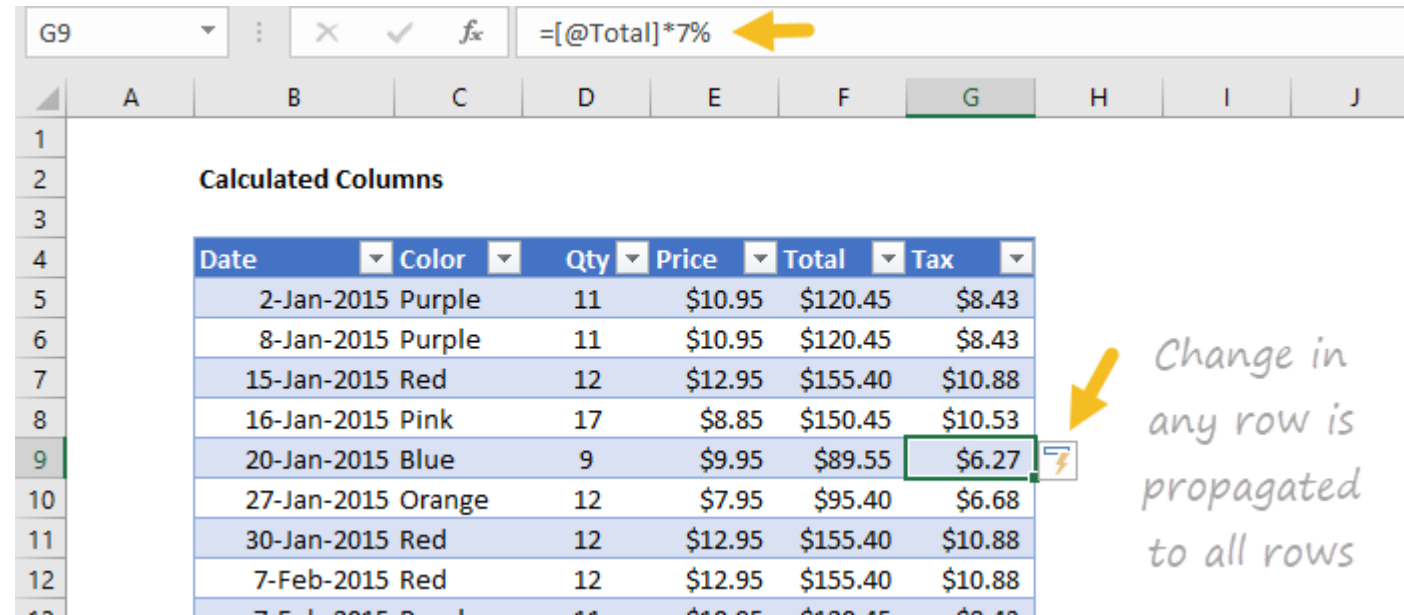
Calculated Columns

Date	Color	Qty	Price	Total	Tax
2-Jan-2015	Purple	11	\$10.95	\$120.45	\$7.23
8-Jan-2015	Purple	11	\$10.95	\$120.45	\$7.23
15-Jan-2015	Red	12	\$12.95	\$155.40	\$9.32
16-Jan-2015	Pink	17	\$8.85	\$150.45	\$9.03
20-Jan-2015	Blue	9	\$9.95	\$89.55	\$5.37
27-Jan-2015	Orange	12	\$7.95	\$95.40	\$5.72
30-Jan-2015	Red	12	\$12.95	\$155.40	\$9.32
7-Feb-2015	Red	12	\$12.95	\$155.40	\$9.32

Formula automatically fills column

10. Change Formulas Automatically

The same feature also handles formula changes. If you make a change to the formula anywhere in a calculated column, the formula is updated throughout the entire column. In the screen below, the tax rate has been changed to 7% in one step.



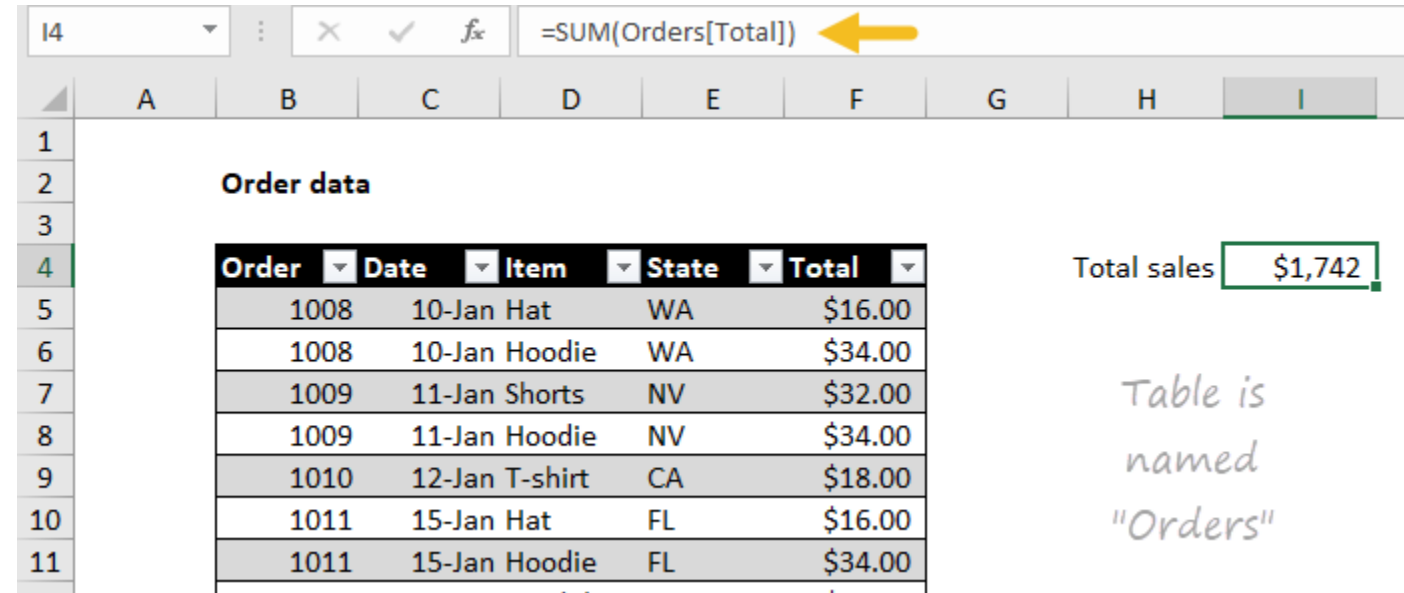
The screenshot shows an Excel spreadsheet with a table titled "Calculated Columns". The formula bar at the top displays `=[@Total]*7%` with a yellow arrow pointing to it. The table has columns: Date, Color, Qty, Price, Total, and Tax. Row 9 is highlighted, showing a tax value of \$6.27. A handwritten note with a yellow arrow points to the Tax column, stating: "Change in any row is propagated to all rows".

Date	Color	Qty	Price	Total	Tax
2-Jan-2015	Purple	11	\$10.95	\$120.45	\$8.43
8-Jan-2015	Purple	11	\$10.95	\$120.45	\$8.43
15-Jan-2015	Red	12	\$12.95	\$155.40	\$10.88
16-Jan-2015	Pink	17	\$8.85	\$150.45	\$10.53
20-Jan-2015	Blue	9	\$9.95	\$89.55	\$6.27
27-Jan-2015	Orange	12	\$7.95	\$95.40	\$6.68
30-Jan-2015	Red	12	\$12.95	\$155.40	\$10.88
7-Feb-2015	Red	12	\$12.95	\$155.40	\$10.88

11. Human-Readable Formulas

Tables use a special formula syntax to refer to parts of a table by name. This feature is called "structured references". For example, to SUM a column called "Amount" in a table called "Orders", you can use a formula like this:

```
=SUM(Orders[Amount])
```



The screenshot shows an Excel spreadsheet with a table titled "Order data". The formula bar at the top displays `=SUM(Orders[Total])` with a yellow arrow pointing to it. The table has columns: Order, Date, Item, State, and Total. To the right of the table, the text "Total sales" is followed by a cell containing the value \$1,742. A handwritten note states: "Table is named 'Orders'" (referring to the table name used in the formula).

Order	Date	Item	State	Total
1008	10-Jan	Hat	WA	\$16.00
1008	10-Jan	Hoodie	WA	\$34.00
1009	11-Jan	Shorts	NV	\$32.00
1009	11-Jan	Hoodie	NV	\$34.00
1010	12-Jan	T-shirt	CA	\$18.00
1011	15-Jan	Hat	FL	\$16.00
1011	15-Jan	Hoodie	FL	\$34.00

Total sales \$1,742

Table is named "Orders"

12. Easy Dynamic Ranges

The single biggest benefit of tables is that they automatically expand as new data is added, creating a dynamic range. You can easily use this dynamic range in your formulas. For example, the table in the screen below is named "Properties". The following formulas will always return correct values, even as data is added to the table:

```
=ROWS(Properties)  
=MAX(Properties)  
=MIN(Properties)
```