Sociedade da Informação e do Conhecimento

Aula 2 e 3

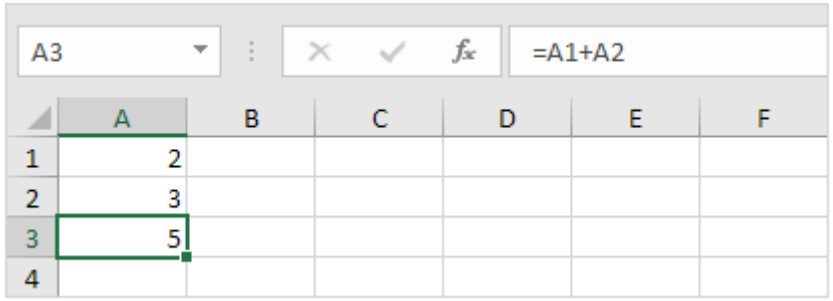
Tutorial Excel

DCT DEPARTAMENTO CIÊNCIA E TECNOLOGIA

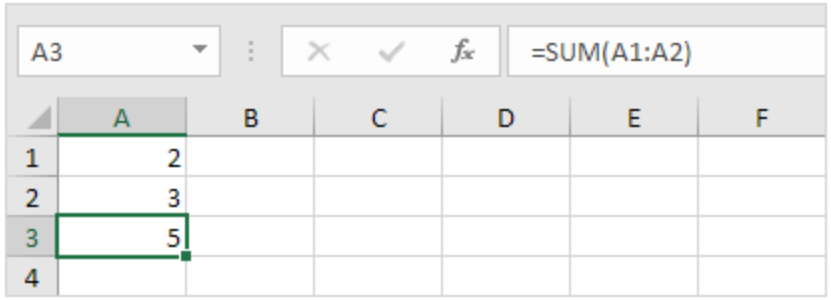
UPT UNIVERSIDADE PORTUCALENSE

Formulas and Functions

A **formula** is an expression which calculates the value of a cell. **Functions** are predefined formulas and are already available in **Excel**.
For example, cell A3 below contains a formula which adds the value of cell A2 to the value of cell A1.



For example, cell A3 below contains the SUM function which calculates the sum of the range A1:A2.



Operator Precedence

Excel uses a default order in which calculations occur. If a part of the formula is in parentheses, that part will be calculated first. It then performs multiplication or division calculations.

Copy/Paste a Formula

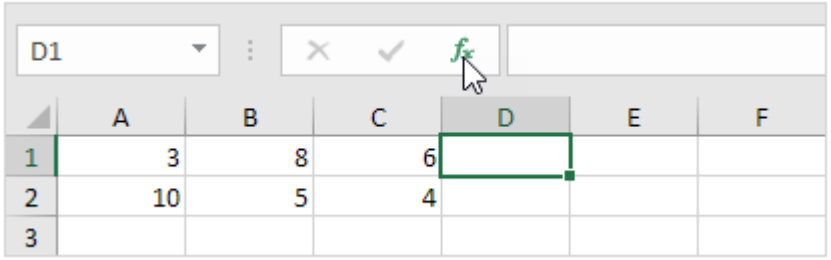
When you copy a formula, Excel automatically adjusts the cell references for each new cell the formula is copied to.

Insert a Function

Every function has the same structure. For example, SUM(A1:A4). The name of this function is SUM. The part between the brackets (arguments) means we give Excel the range A1:A4 as input. This function adds the values in cells A1, A2, A3 and A4. It's not easy to remember which function and which arguments to use for each task. Fortunately, the Insert Function feature in Excel helps you with this.

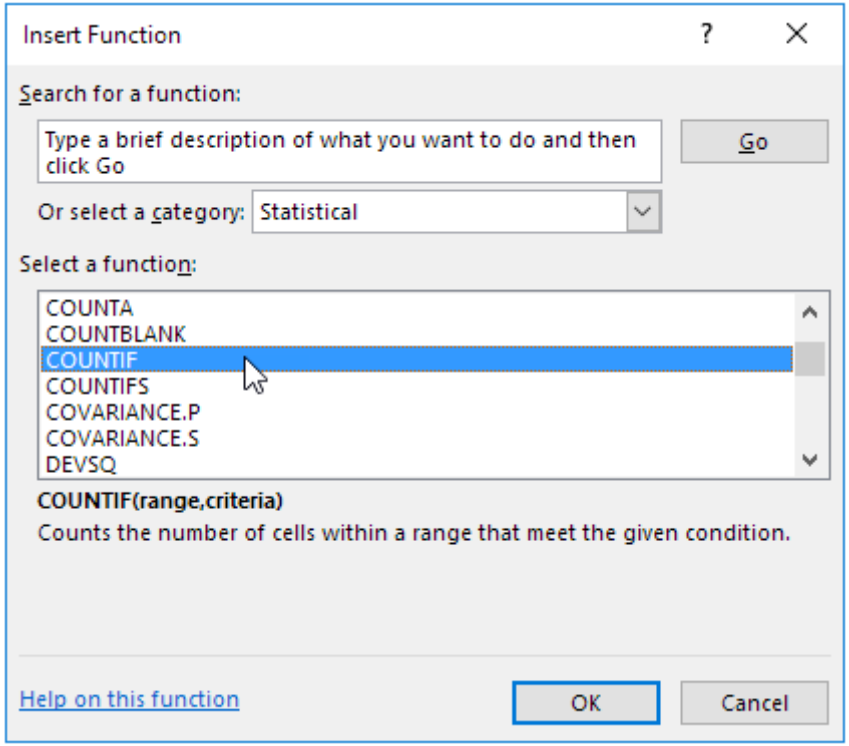
To insert a function, execute the following steps.

1. Select a cell.
2. Click the Insert Function button.



Insert a Function

3. Search for a function or select a function from a category. For example, choose COUNTIF from the Statistical category.

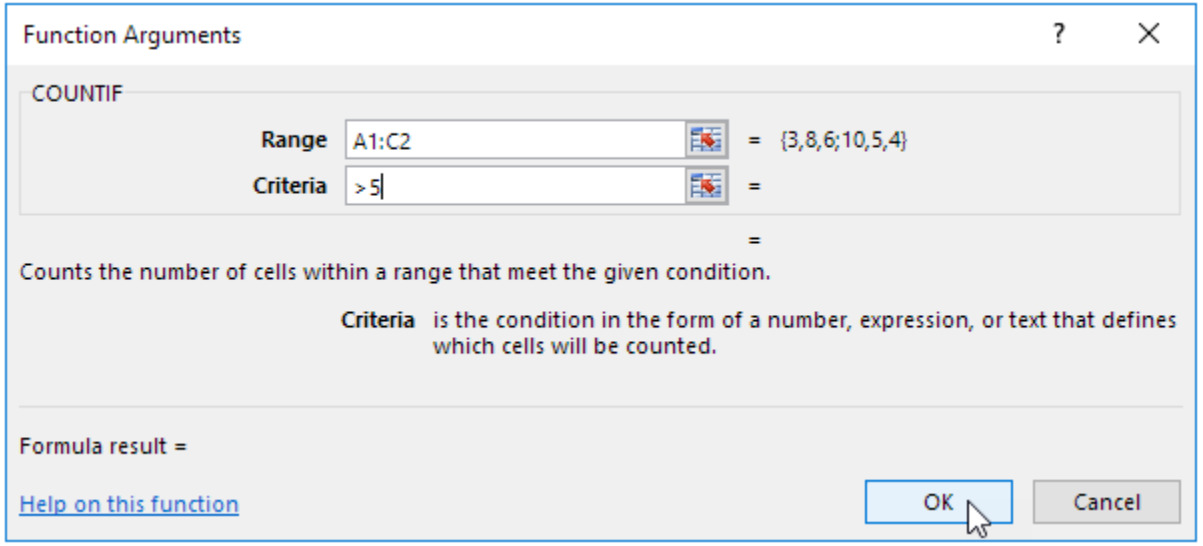


Insert a Function

4. Click OK.

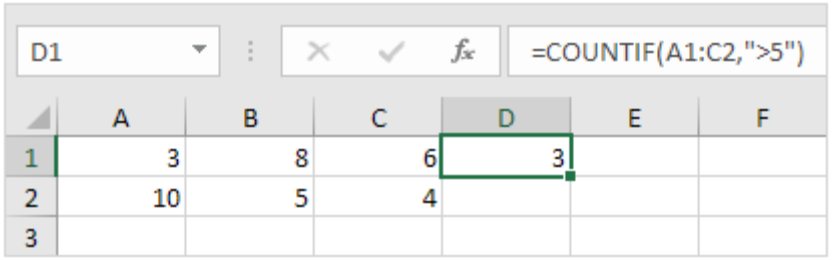
The 'Function Arguments' dialog box appears.

5. Click in the Range box and select the range A1:C2.
6. Click in the Criteria box and type >5.
7. Click OK.



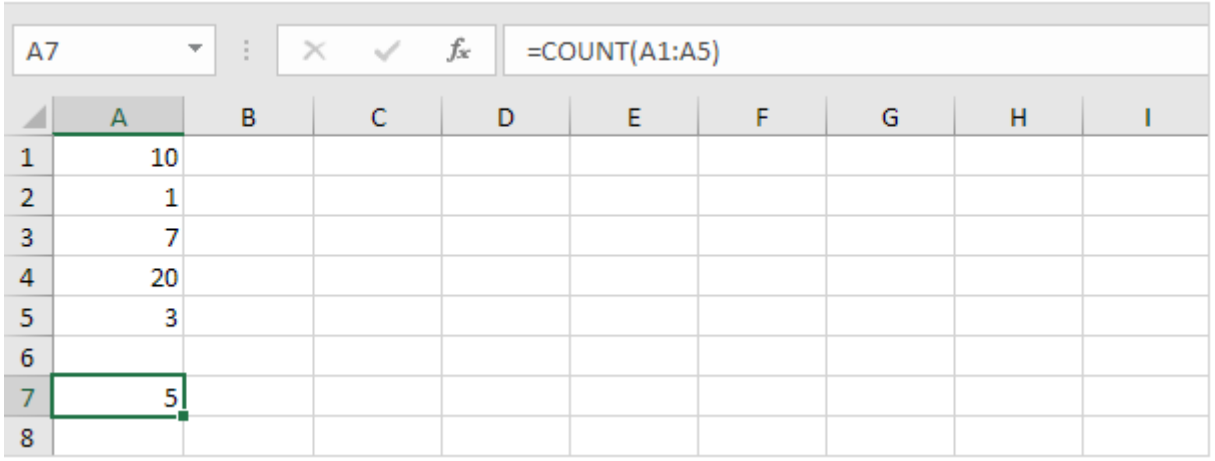
Insert a Function

The COUNTIF function counts the number of cells that are greater than 5.



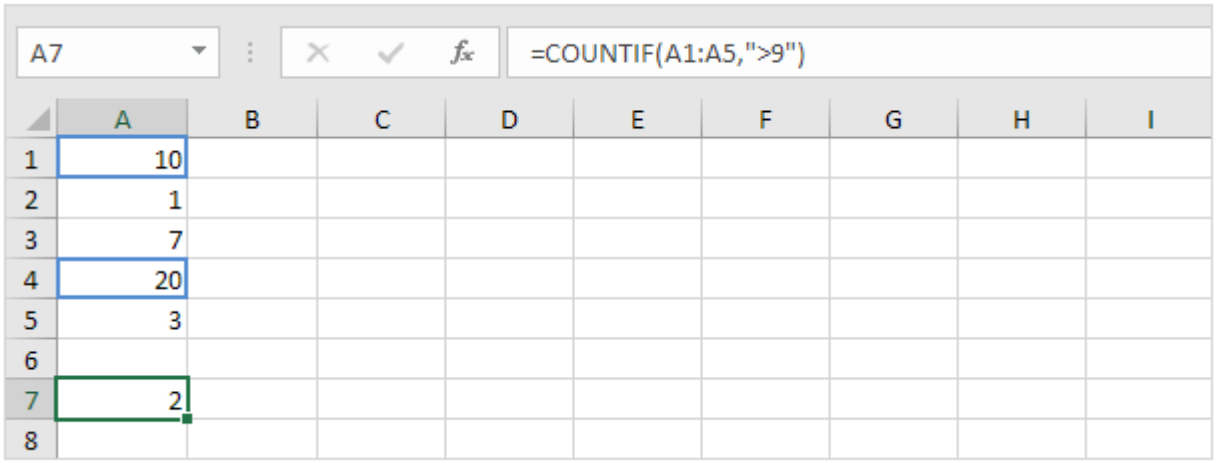
Count

To count the number of cells that contain numbers, use the COUNT function.



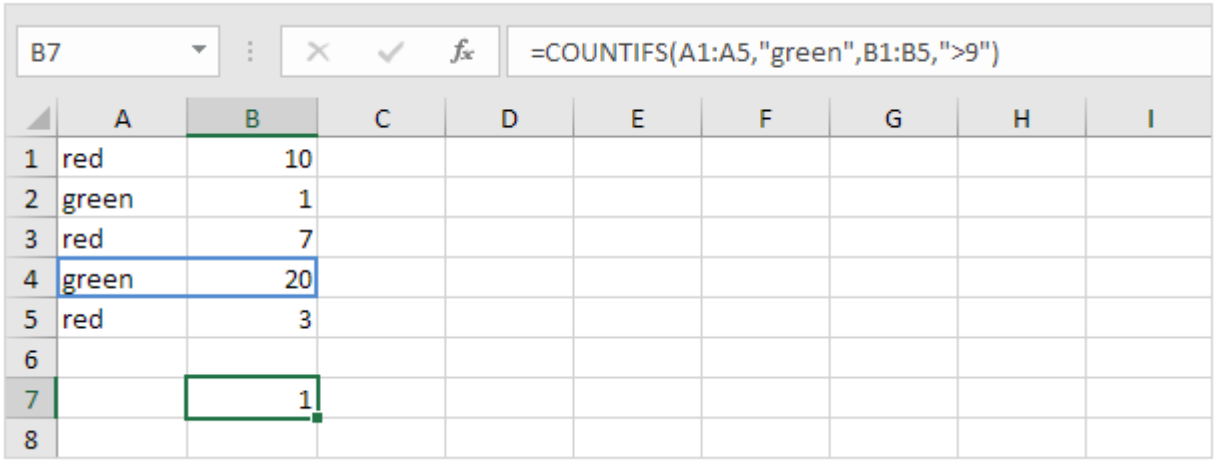
Countif

To count cells based on one criteria (for example, greater than 9), use the following COUNTIF function.



Countifs

To count cells based on multiple criteria (for example, green and greater than 9), use the following COUNTIFS function.

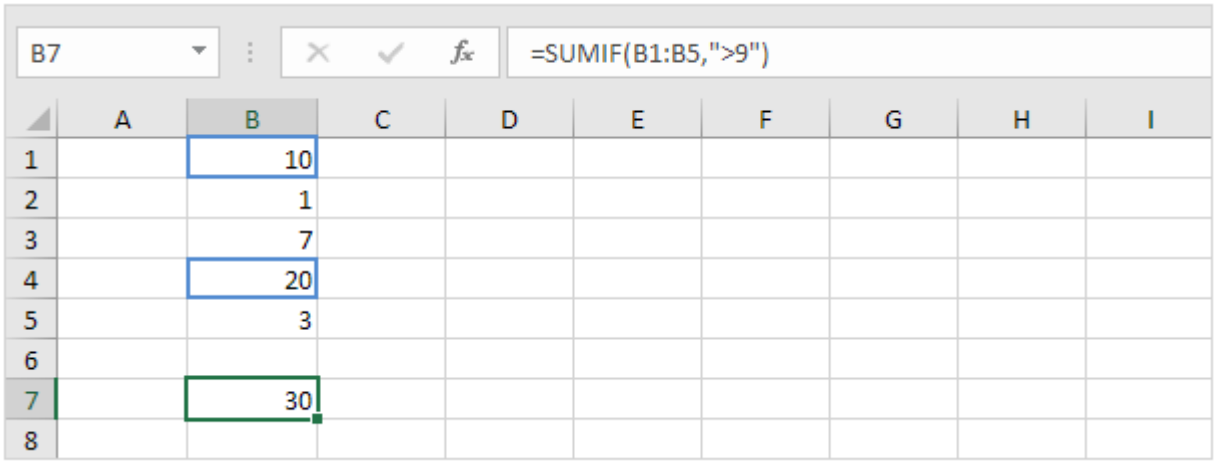


Sum

To sum a range of cells, use the SUM function.

Sumif

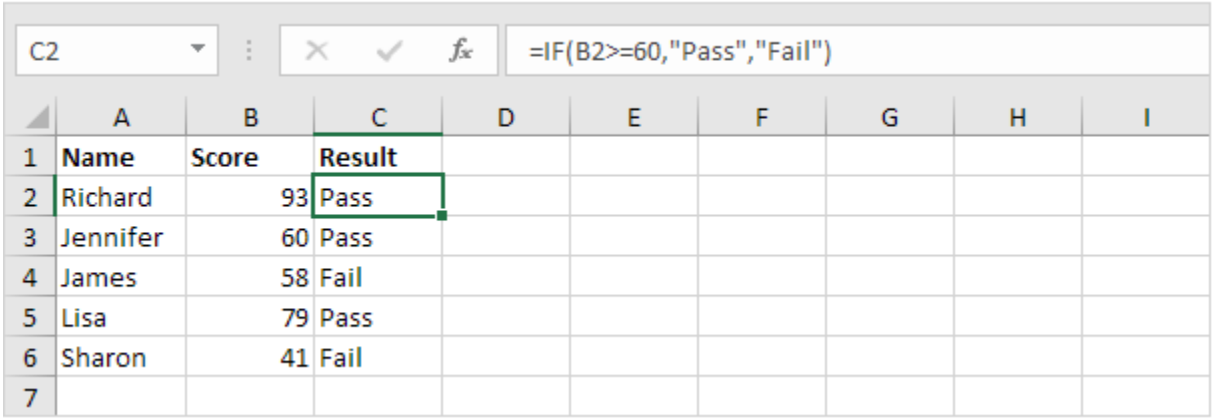
To sum cells based on one criteria (for example, greater than 9), use the following SUMIF function (two arguments).



If

The IF function checks whether a condition is met, and returns one value if true and another value if false.

1. For example, take a look at the IF function in cell C2 below.

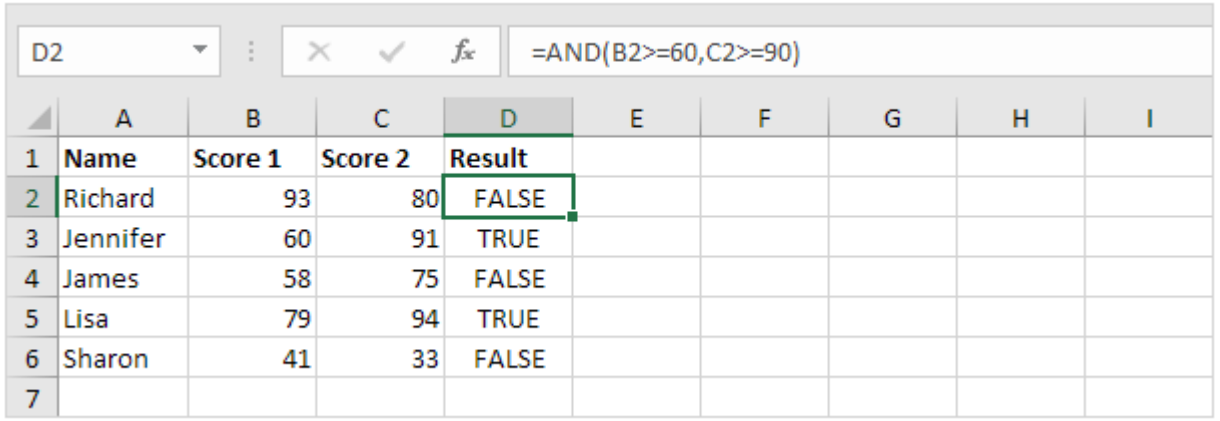


	A	B	C	D	E	F	G	H	I
1	**Name**	**Score**	**Result**						
2	Richard	93	Pass						
3	Jennifer	60	Pass						
4	James	58	Fail						
5	Lisa	79	Pass						
6	Sharon	41	Fail						
7									

And

The AND Function returns TRUE if all conditions are true and returns FALSE if any of the conditions are false.

1. For example, take a look at the AND function in cell D2 below.



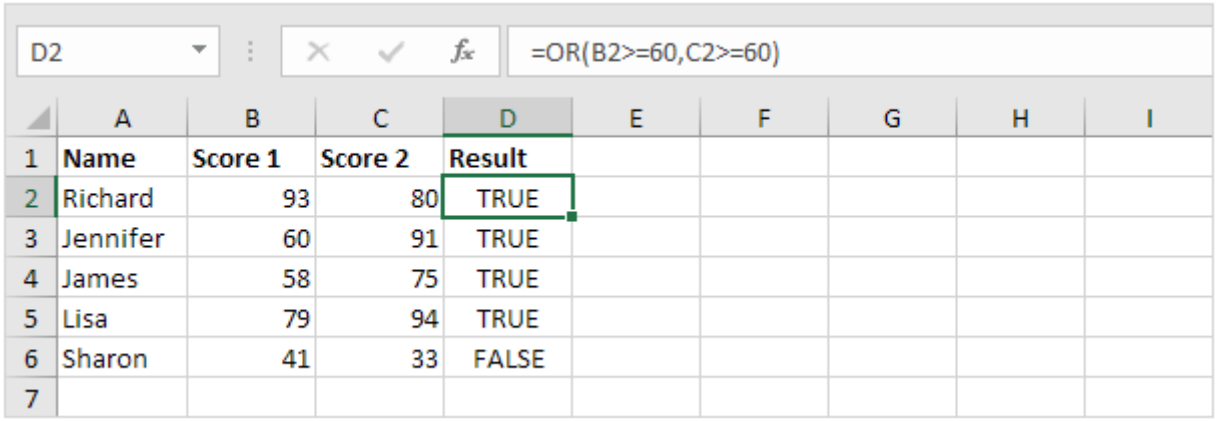
D2 | =AND(B2>=60,C2>=90)

	A	B	C	D	E	F	G	H	I
1	**Name**	**Score 1**	**Score 2**	**Result**					
2	Richard	93	80	FALSE					
3	Jennifer	60	91	TRUE					
4	James	58	75	FALSE					
5	Lisa	79	94	TRUE					
6	Sharon	41	33	FALSE					
7									

Or

The OR function returns TRUE if any of the conditions are TRUE and returns FALSE if all conditions are false.

1. For example, take a look at the OR function in cell D2 below.



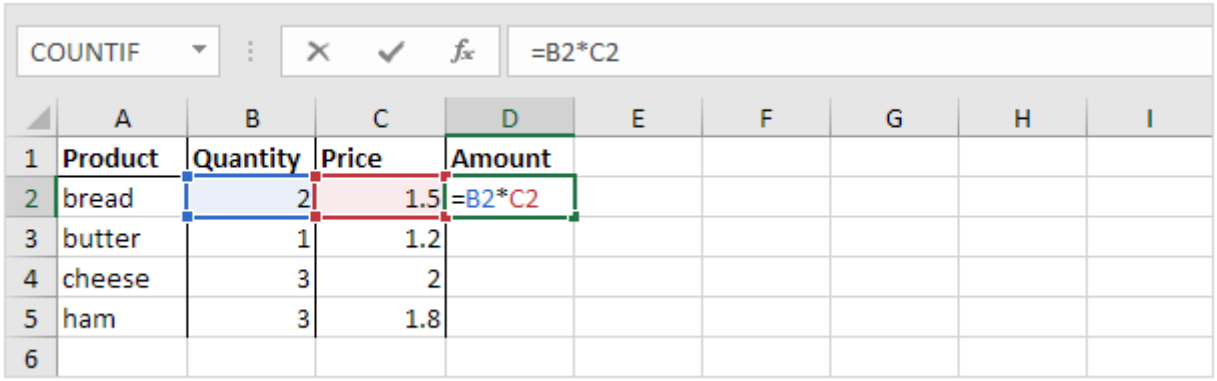
D2 | =OR(B2>=60,C2>=60)

	A	B	C	D	E	F	G	H	I
1	**Name**	**Score 1**	**Score 2**	**Result**					
2	Richard	93	80	TRUE					
3	Jennifer	60	91	TRUE					
4	James	58	75	TRUE					
5	Lisa	79	94	TRUE					
6	Sharon	41	33	FALSE					
7									

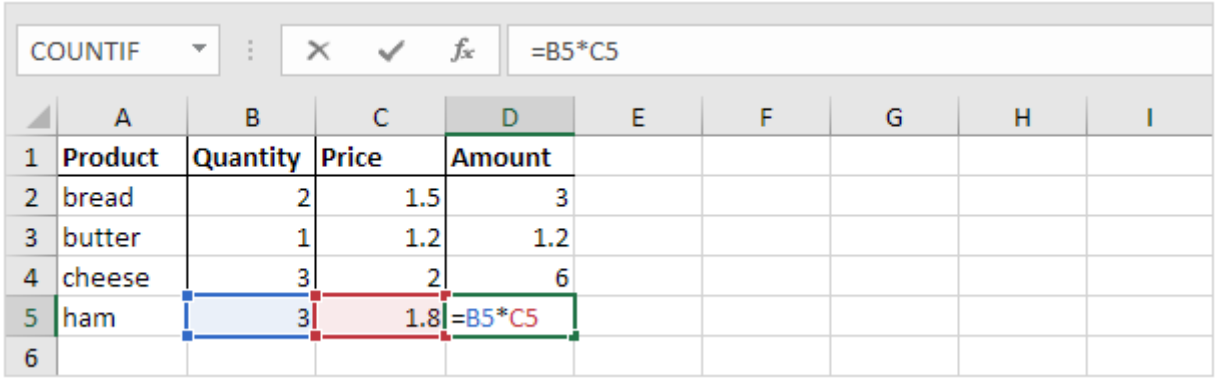
Cell References

Relative Reference

By default, Excel uses **relative references**. See the formula in cell D2 below. Cell D2 references (points to) cell B2 and cell C2. Both references are relative.



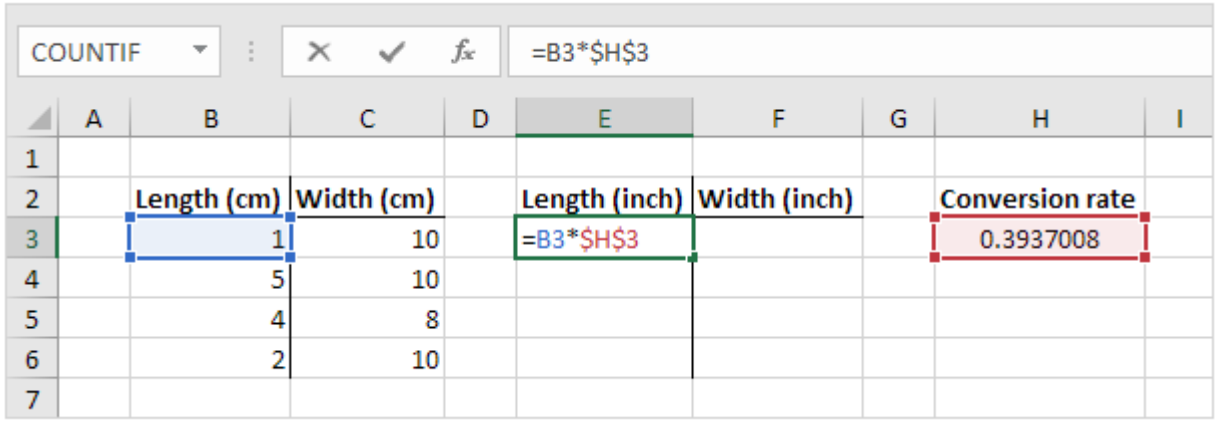
1. Select cell D2, click on the lower right corner of cell D2 and drag it down to cell D5.



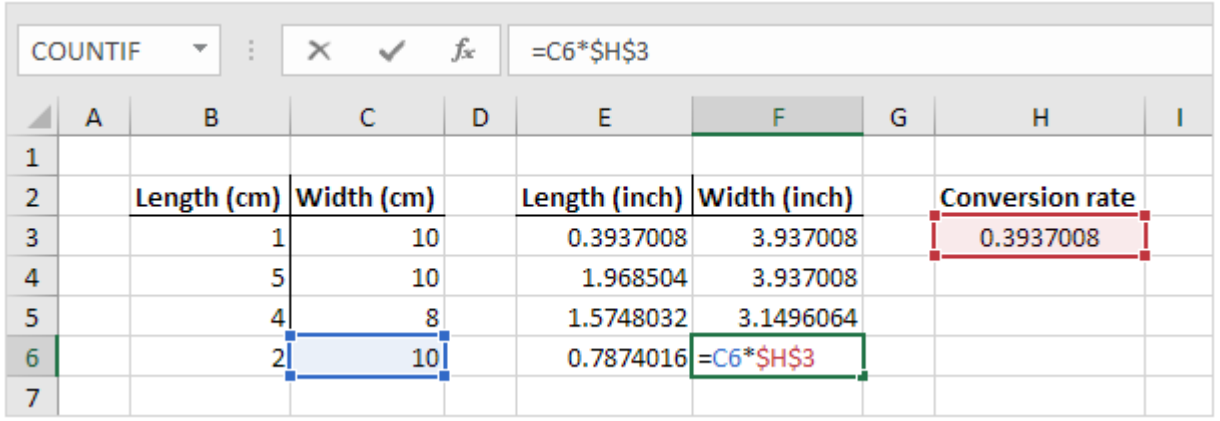
Cell References

Absolute Reference

To create an **absolute reference** to cell H3, place a $ symbol in front of the column letter and row number (H3) in the formula of cell E3.



2. Now we can quickly drag this formula to the other cells.

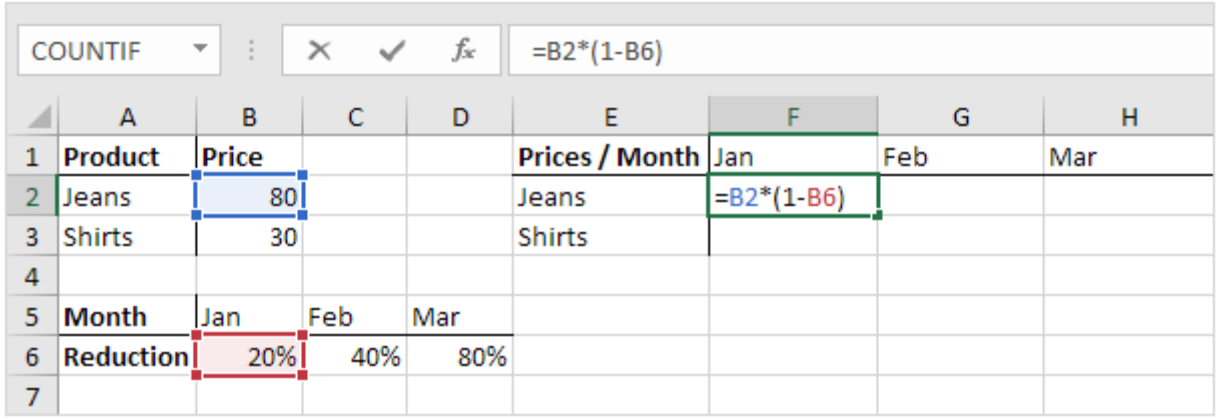


Cell References

Mixed Reference

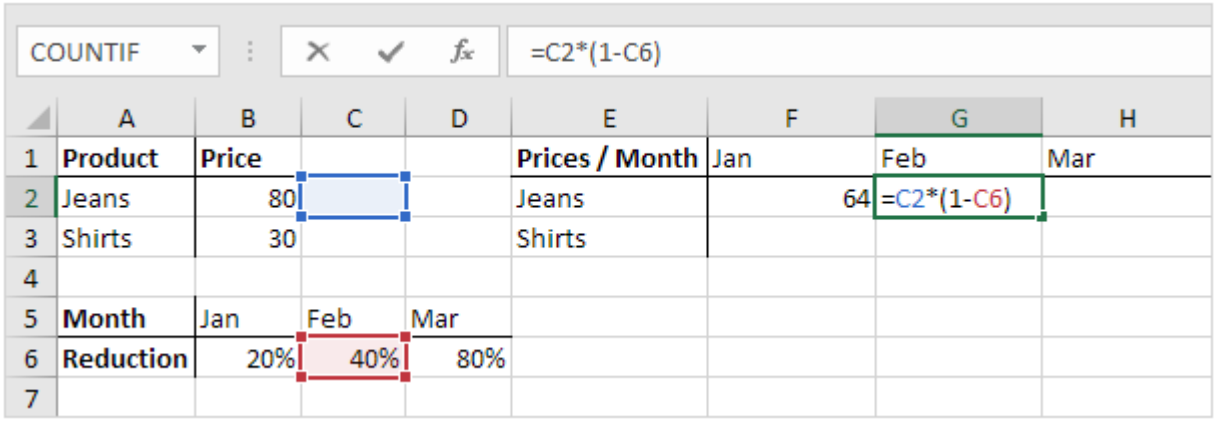
Sometimes we need a combination of relative and absolute reference (**mixed reference**).

1. See the formula in cell F2 below.



	A	B	C	D	E	F	G	H
1	**Product**	**Price**			**Prices / Month**	Jan	Feb	Mar
2	Jeans	80			Jeans	=B2*(1-B6)		
3	Shirts	30			Shirts			
4								
5	**Month**	Jan	Feb	Mar				
6	**Reduction**	20%	40%	80%				
7								

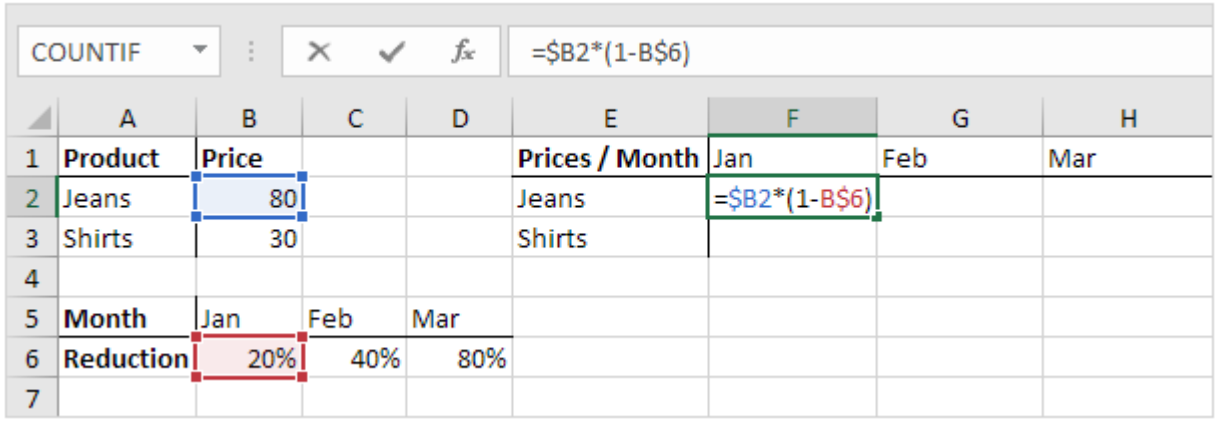
2. We want to copy this formula to the other cells quickly. Drag cell F2 across one cell, and look at the formula in cell G2.



	A	B	C	D	E	F	G	H
1	**Product**	**Price**			**Prices / Month**	Jan	Feb	Mar
2	Jeans	80			Jeans	64	=C2*(1-C6)	
3	Shirts	30			Shirts			
4								
5	**Month**	Jan	Feb	Mar				
6	**Reduction**	20%	40%	80%				
7								

Cell References

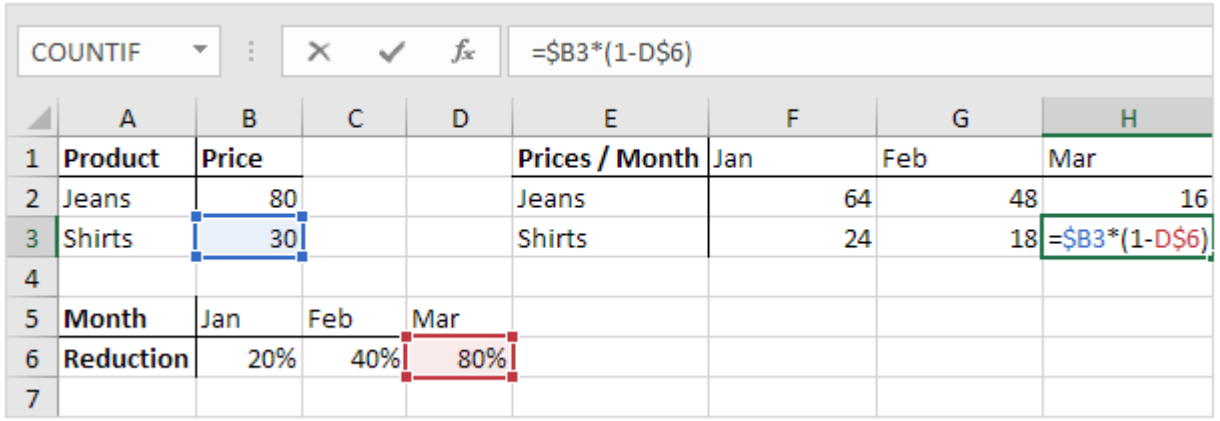
Do you see what happens? The reference to the price should be a fixed reference to column B. Solution: place a $ symbol in front of the column letter ($B2) in the formula of cell F2. In a similar way, when we drag cell F2 down, the reference to the reduction should be a fixed reference to row 6. Solution: place a $ symbol in front of the row number (B$6) in the formula of cell F2.



	A	B	C	D	E	F	G	H
1	**Product**	**Price**			**Prices / Month**	Jan	Feb	Mar
2	Jeans	80			Jeans	=$B2*(1-B$6)		
3	Shirts	30			Shirts			
4								
5	**Month**	Jan	Feb	Mar				
6	**Reduction**	20%	40%	80%				
7								

Cell References

Note: we don't place a $ symbol in front of the row number of $B2 (this way we allow the reference to change from $B2 (Jeans) to $B3 (Shirts) when we drag the formula down). In a similar way, we don't place a $ symbol in front of the column letter of B$6 (this way we allow the reference to change from B$6 (Jan) to C$6 (Feb) and D$6 (Mar) when we drag the formula across).
3. Now we can quickly drag this formula to the other cells.

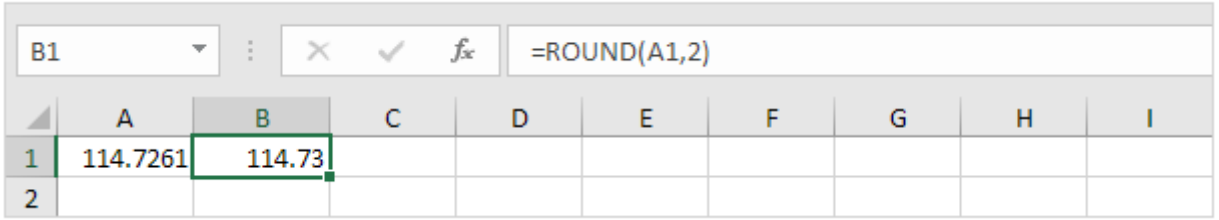


	A	B	C	D	E	F	G	H
1	**Product**	**Price**			**Prices / Month**	Jan	Feb	Mar
2	Jeans	80			Jeans	64	48	16
3	Shirts	30			Shirts	24	18	=$B3*(1-D$6)
4								
5	**Month**	Jan	Feb	Mar				
6	**Reduction**	20%	40%	80%				
7								

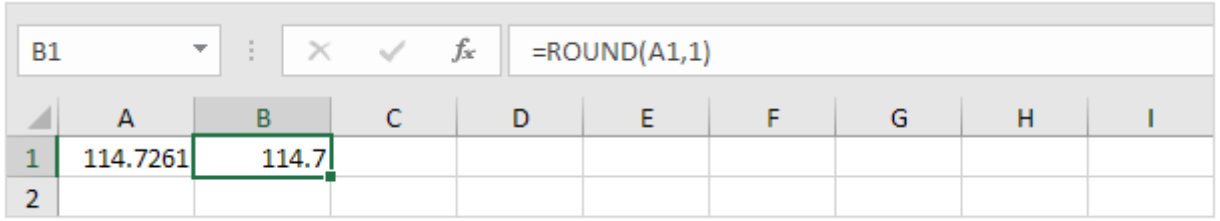
Functions

Round

1. Round a number to two decimal places.



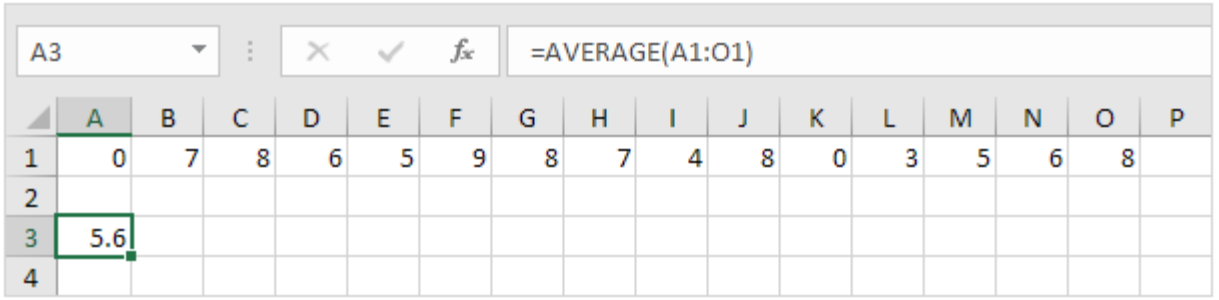
2. Round a number to one decimal place.



Functions

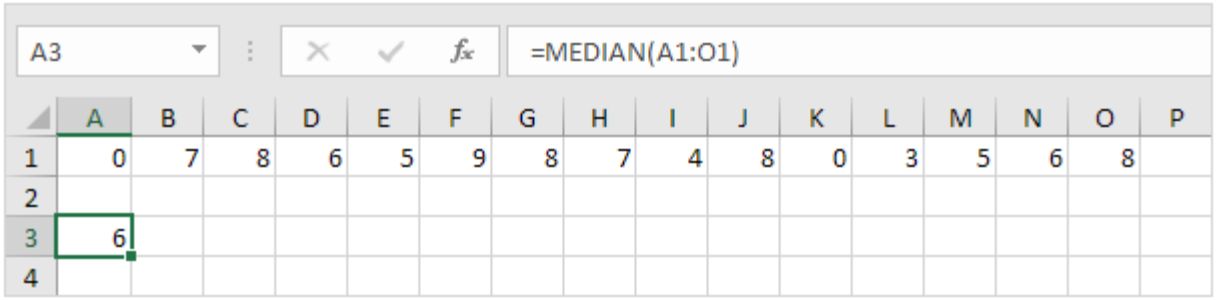
Average

To calculate the average of a range of cells, use the AVERAGE function.



Median

To find the median (or middle number), use the MEDIAN function.



Functions

Mode

To find the most frequently occurring number, use the MODE function.

Standard Deviation

To calculate the standard deviation, use the STEDV function.

Min

To find the minimum value, use the MIN function.

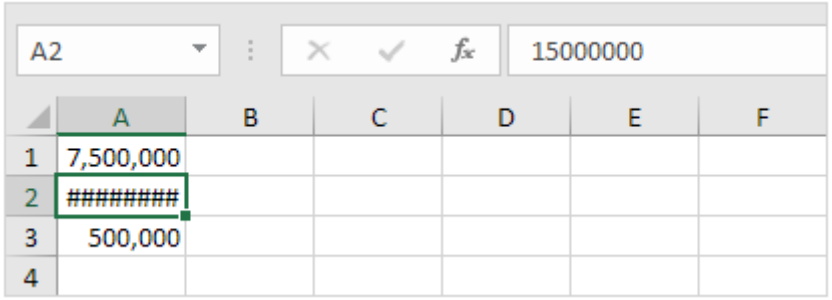
Max

To find the maximum value, use the MAX function.

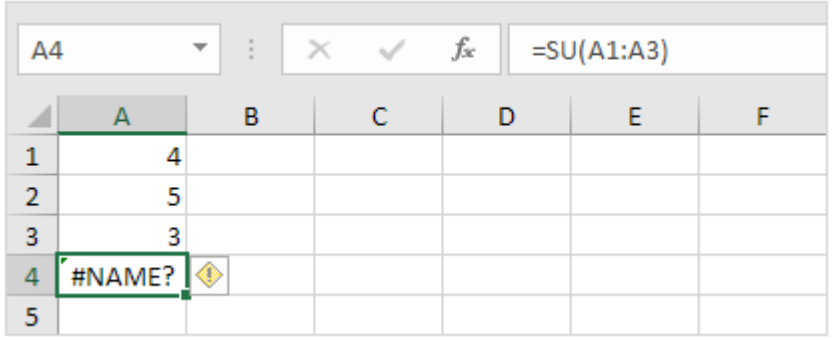
Formula Errors

error

When your cell contains this **error code**, the column isn't wide enough to display the value.



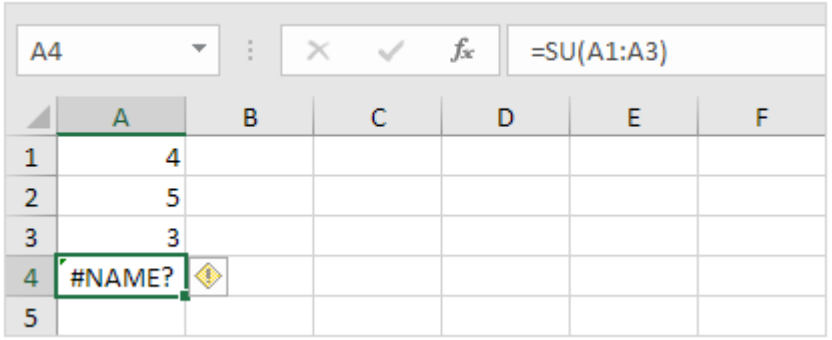
1. Click on the right border of the column A header and increase the column width.



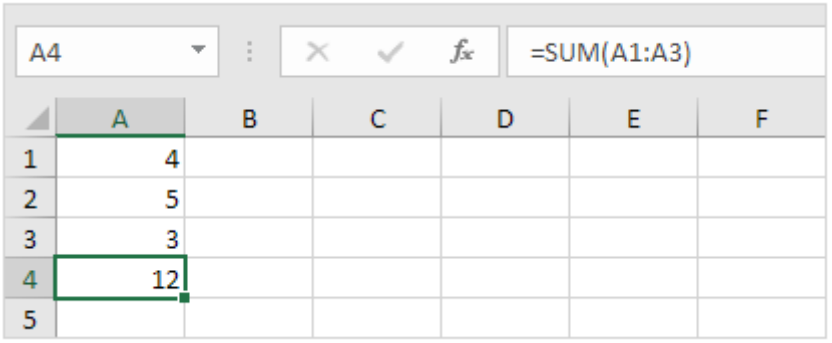
Formula Errors

#NAME? error

The #NAME? error occurs when Excel does not recognize text in a formula.



1. Simply correct SU to SUM.



Formula Errors

#VALUE! error

Excel displays the #VALUE! error when a formula has the wrong type of argument.

#DIV/0! error

Excel displays the #DIV/0! error when a formula tries to divide a number by 0 or an empty cell.

#REF! error

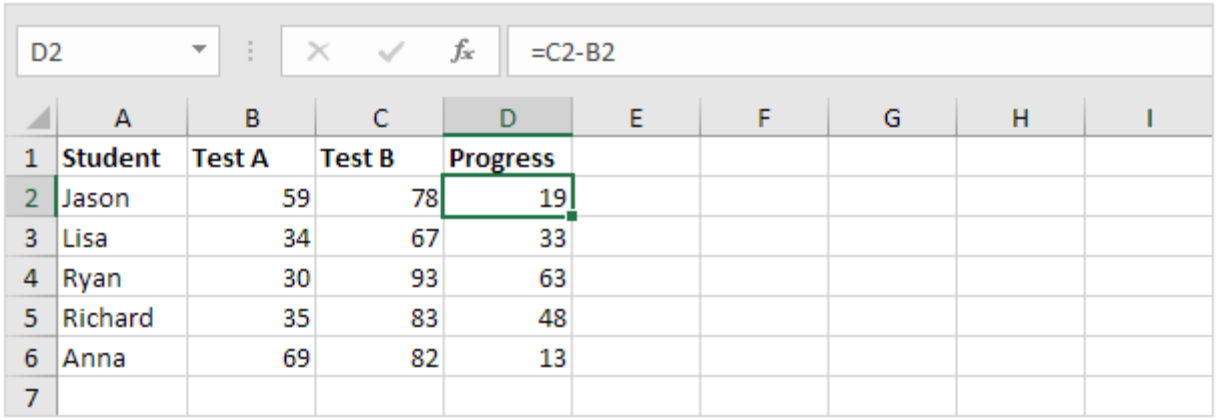
Excel displays the #REF! error when a formula refers to a cell that is not valid.

Array Formulas

Without Array Formula

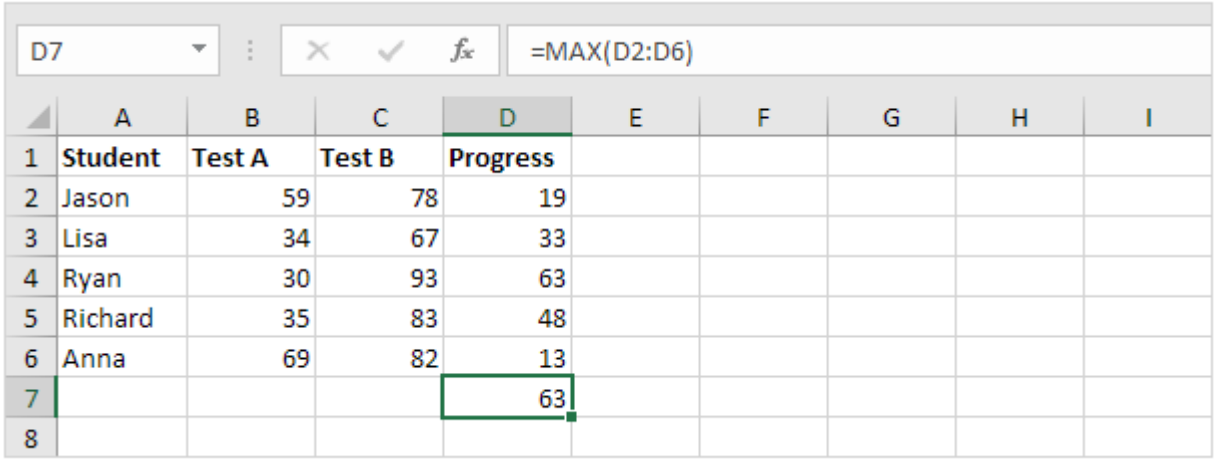
Without using an array formula, we would execute the following steps to find the greatest progress.

1. First, we would calculate the progress of each student.



	A	B	C	D	E	F	G	H	I
1	**Student**	**Test A**	**Test B**	**Progress**					
2	Jason	59	78	19					
3	Lisa	34	67	33					
4	Ryan	30	93	63					
5	Richard	35	83	48					
6	Anna	69	82	13					
7									

2. Next, we would use the MAX function to find the greatest progress.



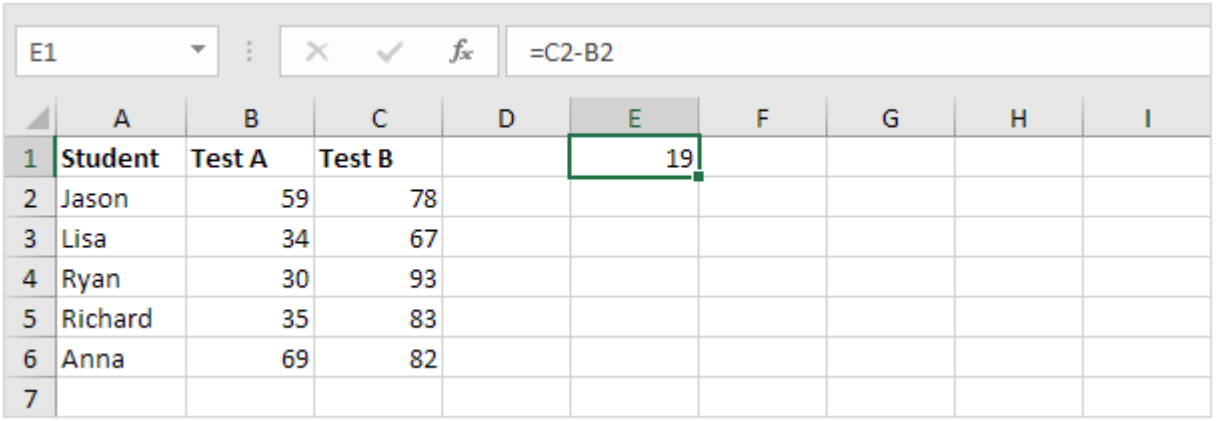
	A	B	C	D	E	F	G	H	I
1	**Student**	**Test A**	**Test B**	**Progress**					
2	Jason	59	78	19					
3	Lisa	34	67	33					
4	Ryan	30	93	63					
5	Richard	35	83	48					
6	Anna	69	82	13					
7				63					
8									

Array Formulas

With Array Formula

We don't need to store the range in column D. Excel can store this range in its memory. A range stored in Excel's memory is called an **array constant**.

1. We already know that we can find the progress of the first student by using the formula below.

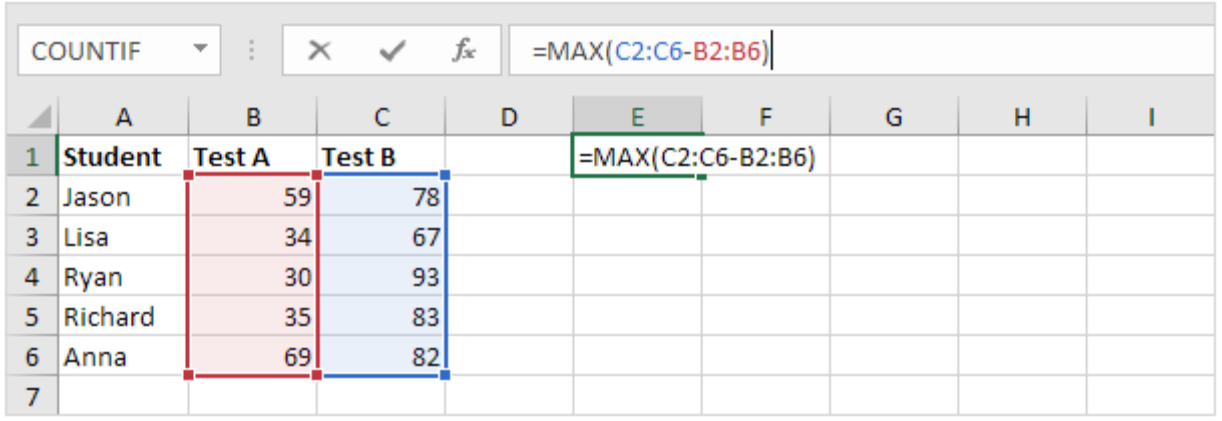


	A	B	C	D	E	F	G	H	I
1	**Student**	**Test A**	**Test B**		19				
2	Jason	59	78						
3	Lisa	34	67						
4	Ryan	30	93						
5	Richard	35	83						
6	Anna	69	82						
7									

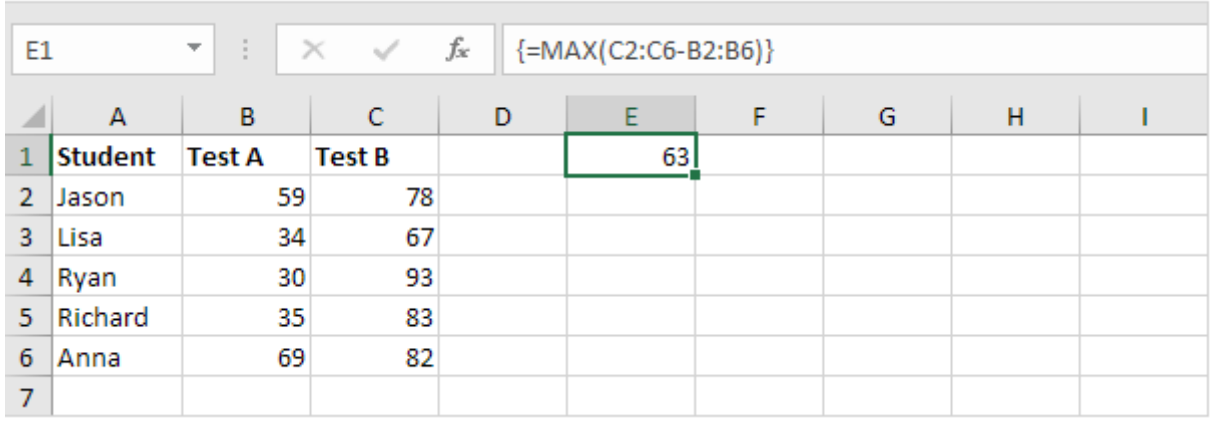
Array Formulas

With Array Formula

2. To find the greatest progress (don't be overwhelmed), we add the MAX function, replace C2 with C2:C6 and B2 with B2:B6.



3. Finish by pressing CTRL + SHIFT + ENTER.



Conditional Formatting

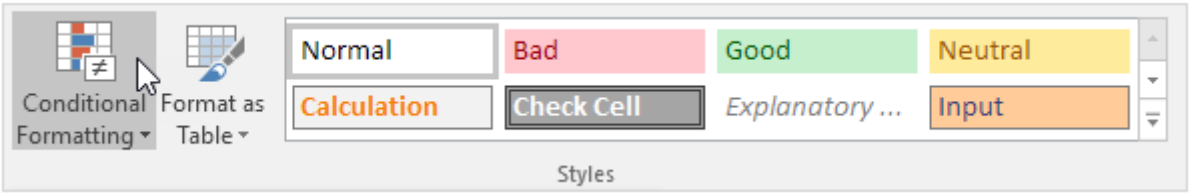
Highlight Cells Rules

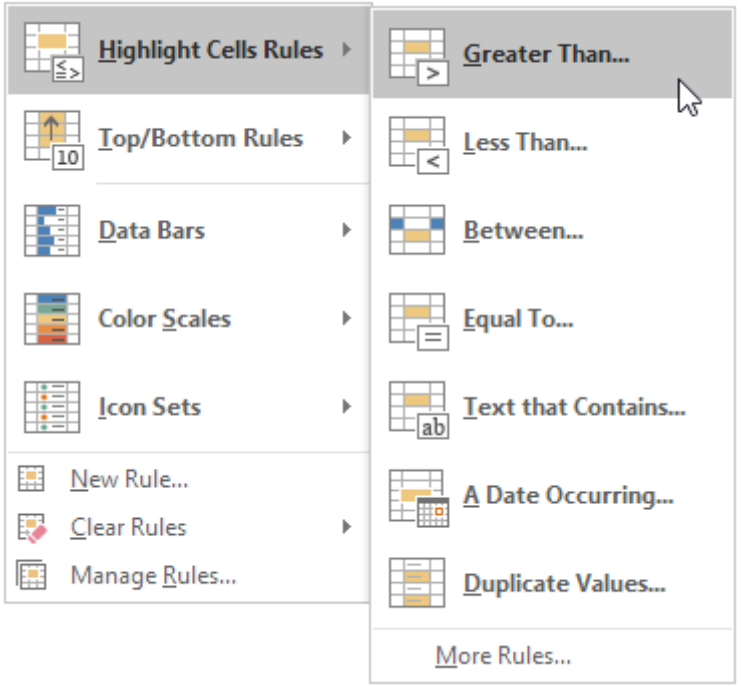
To highlight cells that are greater than a value, execute the following steps.

1. Select the range A1:A10.

	A	B
1	14	
2	6	
3	39	
4	43	
5	2	
6	95	
7	5	
8	11	
9	86	
10	57	
11		

2. On the Home tab, in the Styles group, click Conditional Formatting.



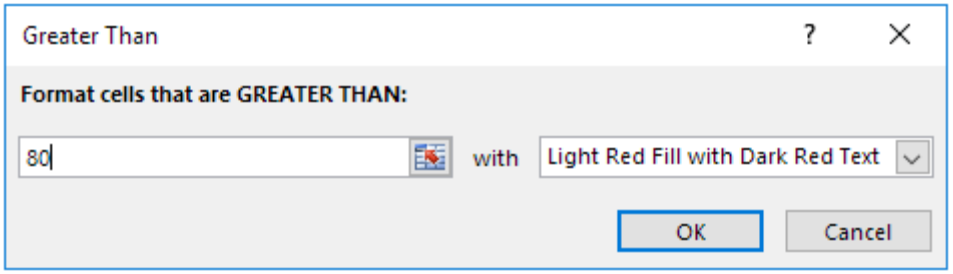


3. Click Highlight Cells Rules, Greater Than.

Conditional Formatting

Highlight Cells Rules

4. Enter the value 80 and select a formatting style.



Conditional Formatting

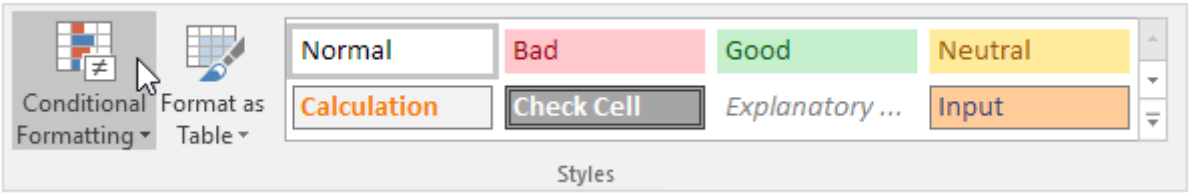
Clear Rules

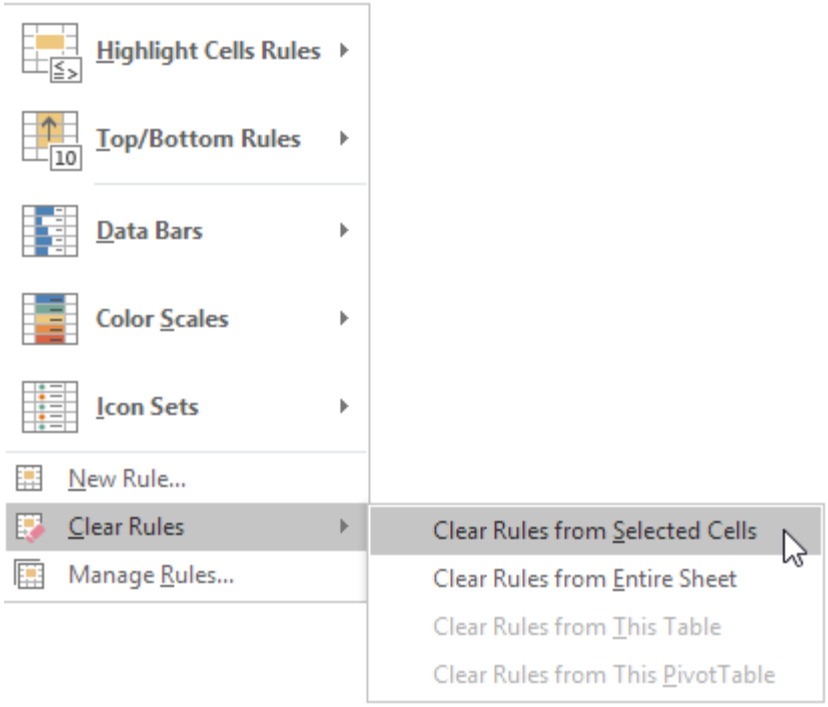
To clear a **conditional formatting rule**, execute the following steps.

1. Select the range A1:A10.

	A	B
1	81	
2	6	
3	39	
4	43	
5	2	
6	95	
7	5	
8	11	
9	86	
10	57	
11		

2. On the Home tab, in the Styles group, click Conditional Formatting.





3. Click Clear Rules, Clear Rules from Selected Cells.

Charts

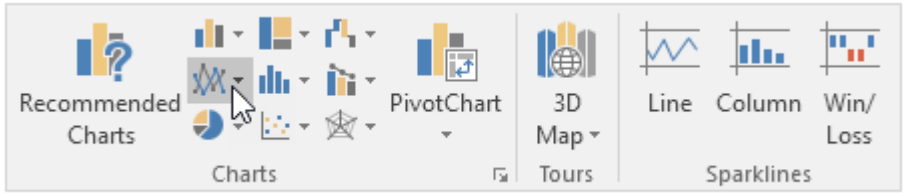
Create a Chart

To create a line chart, execute the following steps.

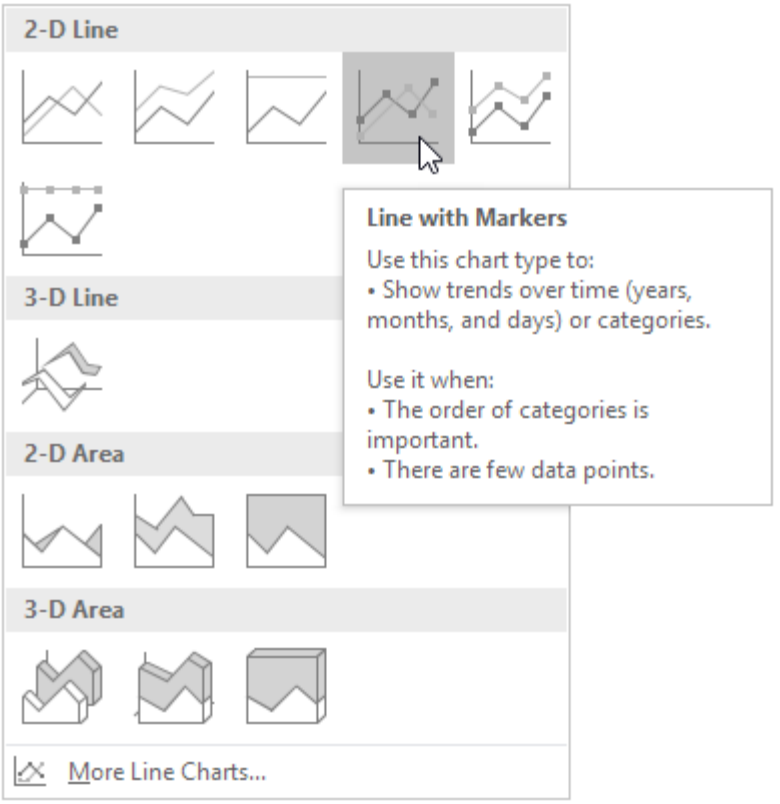
1. Select the range A1:D7.

	A	B	C	D	E
1	Month	Bears	Dolphins	Whales	
2	Jan	8	150	80	
3	Feb	54	77	54	
4	Mar	93	32	100	
5	Apr	116	11	76	
6	May	137	6	93	
7	Jun	184	1	72	
8					

2. On the Insert tab, in the **Charts** group, click the Line symbol.



3. Click Line with Markers.



Charts

Change Chart Type

You can easily change to a different type of chart at any time.

1. Select the chart.
2. On the Design tab, in the Type group, click Change Chart Type.
3. On the left side, click Column.

Switch Row/Column

If you want to display the animals (instead of the months) on the horizontal axis, execute the following steps.

1. Select the chart.
2. On the Design tab, in the Data group, click Switch Row/Column.

Legend Position

To move the legend to the right side of the chart, execute the following steps.

1. Select the chart.
2. Click the + button on the right side of the chart, click the arrow next to Legend and click Right.

Data Labels

You can use data labels to focus your readers' attention on a single data series or data point.

1. Select the chart.
2. Click a green bar to select the Jun data series.
3. Use your arrow keys to select the population of Dolphins in June (tiny green bar).
4. Click the + button on the right side of the chart and click the check box next to Data Labels.

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Do conhecimento à prática.

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E TECNOLOGIA