

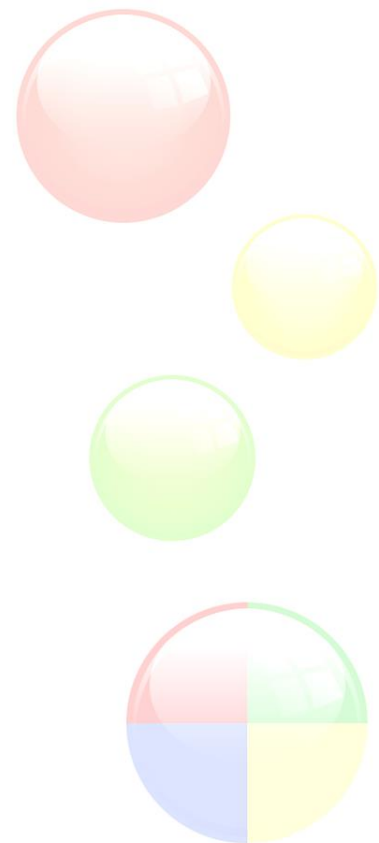


EXCEL - BASIC FORMULAS



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WHAT ARE BASIC FORMULAS?

=SUM(A1:A8)

= - In Excel = is the start of a formula

SUM – SUM means addition

() – The contents of the brackets is the cell range

	A	B
1	100	
2	200	
3	300	
4	100	
5	100	
6	600	
7	9000	
8	700	
9	=SUM(A1:A8)	

There is a space before the formula, the difference with putting a space in front is that the formula will not work but instead display the formula.

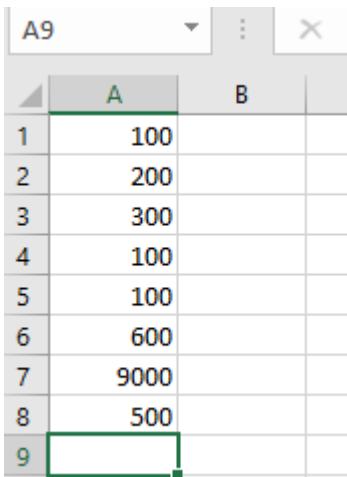


EXERCISE WALKTHROUGH

Learning how to use Basic Formulas

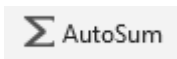
Basic Formulas and AutoSum

Open up a blank spreadsheet and type the following.

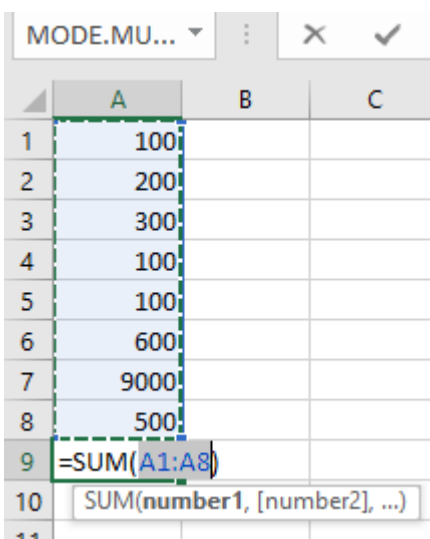


	A	B
1	100	
2	200	
3	300	
4	100	
5	100	
6	600	
7	9000	
8	500	
9		

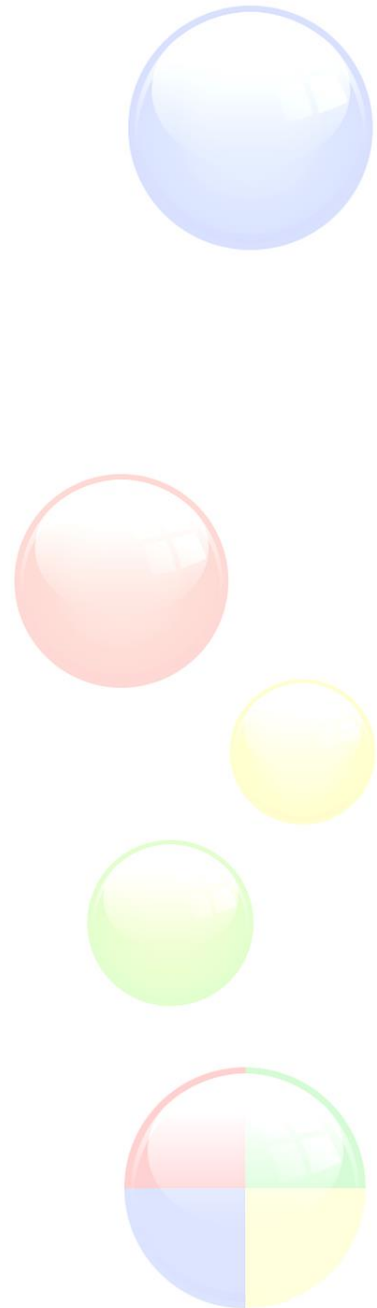
Click into A9, and press this button.



And you should see this.



	A	B	C
1	100		
2	200		
3	300		
4	100		
5	100		
6	600		
7	9000		
8	500		
9	=SUM(A1:A8)		
10	SUM(number1, [number2], ...)		
11			



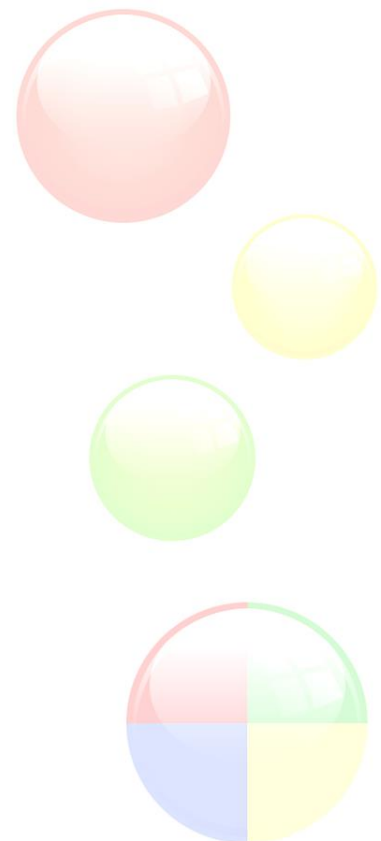
Now press enter, and we can see that the formula automatically calculates the sum of A1 to A8.

100	
200	
300	
100	
100	
600	
9000	
500	
10900	=SUM(A1:A8)



If we decide to change one of the values within the cell range A1-A8 it will re-calculate.

A	B	C
100		
200		
300		
100		
100		
600		
9000		
700		
11100	=SUM(A1:A8)	



Alternative formatting

Here is another way to enter this formula.

	A	B	C
1	100		
2	200		
3	300		
4	100		
5	100		
6	600		
7	9000		
8	700		
9	=A1+A2+A3+A4+A5+A6+A7+A8		
10			



"AutoSum" is a lot quicker, but both formulas work the same.

Now return your spreadsheet to looking like this.

	A	B
	100	
	200	
	300	
	100	
	100	
	600	
	9000	
	700	
	=SUM(A1:A8)	

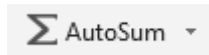


Exit the cell.

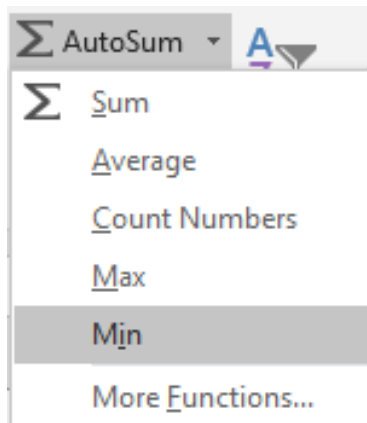
WORKING WITH AUTOSUM

Min

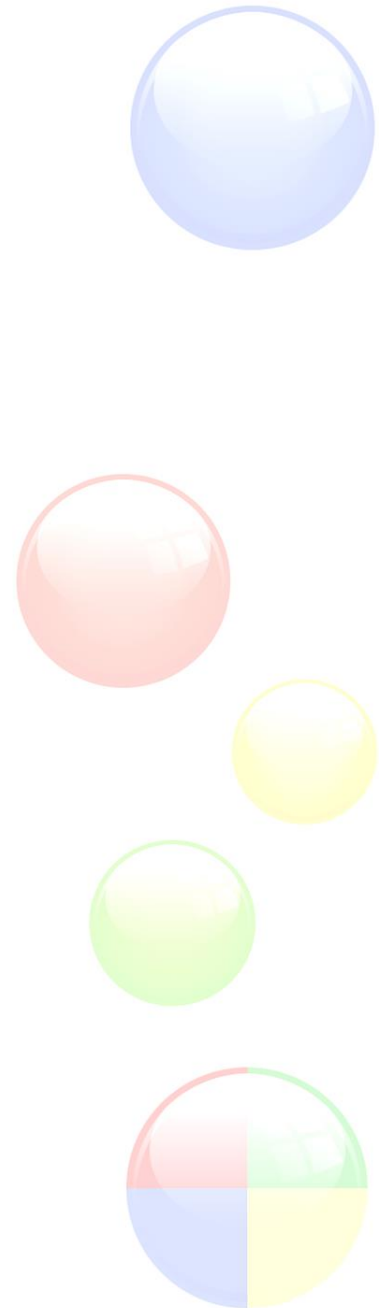
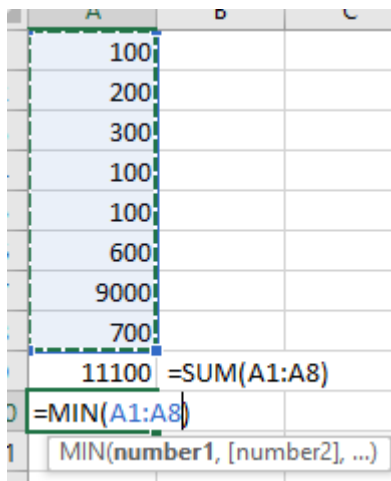
Now press the downwards triangle next to AutoSum.



And select "Min"



Make sure that the cell range is (A1:A8)



=MIN finds the smallest number (Minimum value) of the cell range.

	A	B	C
1	100		
2	200		
3	300		
4	100		
5	100		
6	600		
7	9000		
8	700		
9	11100	=SUM(A1:A8)	
10	100	=MIN(A1:A8)	



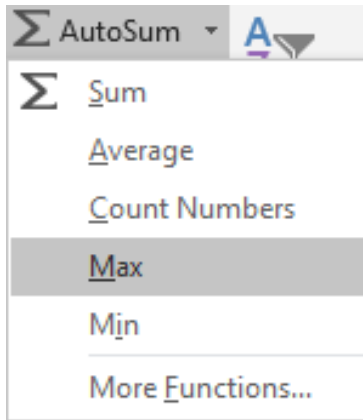
So, if we decide to change one of the values now, both formulas will recalculate.

	A	B	C
	100		
	200		
	300		
	100		
	100		
	50		
	9000		
	700		
	10550	=SUM(A1:A8)	
	50	=MIN(A1:A8)	

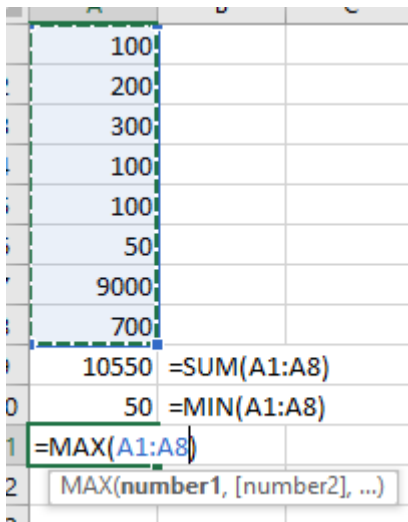


MAX

Now in cell C11 we will put "Max"



Make sure that the cell range is (A1:A8)



This is what you should see.

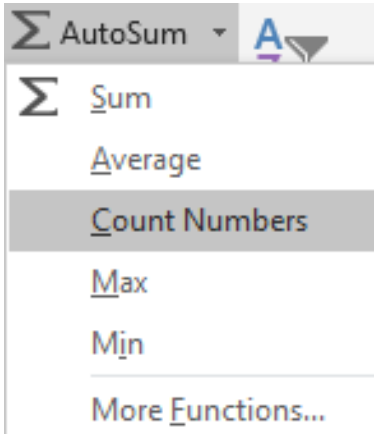
=MAX finds the biggest number (Maximum value) of the cell range.

A	B	C
100		
200		
300		
100		
100		
50		
9000		
700		
10550	=SUM(A1:A8)	
50	=MIN(A1:A8)	
9000	=MAX(A1:A8)	

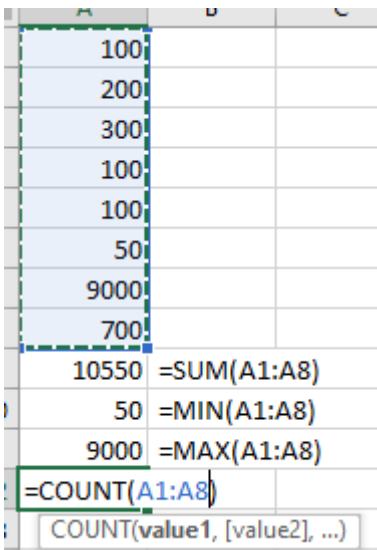


Count Numbers

Now in cell C12 we will put "Count Numbers"



Make sure that the cell range is (A1:A8)



Now when we press enter, we see that the value displayed is 8

	100	
	200	
	300	
	100	
	100	
	50	
	9000	
	700	
	10550	=SUM(A1:A8)
0	50	=MIN(A1:A8)
1	9000	=MAX(A1:A8)
2	8	=COUNT(A1:A8)



=COUNT adds up the number of cells in a cell range that have numbers in them.

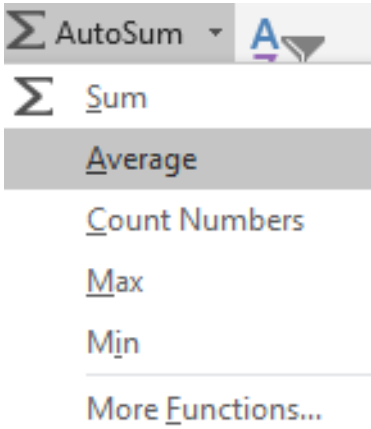
If we click into A2 and type "Excel", we can see that the count decreases to "7".

	100	
	Excel	
	300	
	100	
	100	
	50	
	9000	
	700	
	10350	=SUM(A1:A8)
0	50	=MIN(A1:A8)
1	9000	=MAX(A1:A8)
2	7	=COUNT(A1:A8)



Average

Now in cell C3 we will put "Average".



Make sure that the cell range is (A1:A8)

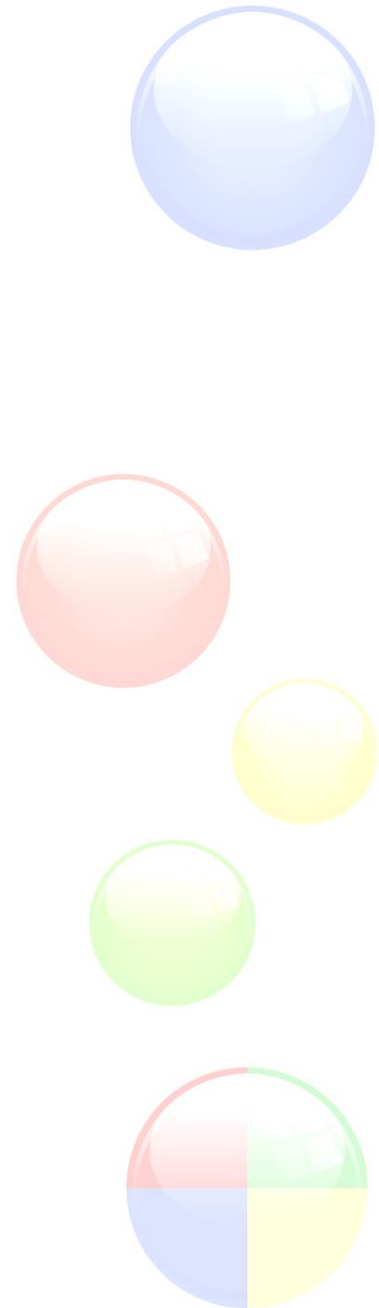
	A	B	C	D	E
1	100				
2	200				
3	300		=AVERAGE(A1:A8)		
4	100		AVERAGE(number1, [number2], ...)		
5	100				
6	50				
7	9000				
8	700				
9	10550	=SUM(A1:A8)			
0	50	=MIN(A1:A8)			
1	9000	=MAX(A1:A8)			
2	8	=COUNT(A1:A8)			



=AVERAGE means that the values in a cell range are added up, and divided by the number of values there are, so for this average it is working out A1+A2+A3+A4+A5+A6+A7+A8 which is 10550, and the dividing 10550 by 8 which is 1318.75 which is what should be displayed in our cell.

A	B	C	D	E
100				
200				
300		1318.75	=AVERAGE(A1:A8)	
100				
100				
50				
9000				
700				
10550	=SUM(A1:A8)			
50	=MIN(A1:A8)			
9000	=MAX(A1:A8)			
8	=COUNT(A1:A8)			

This is called the "Median", and is an equal share of the total.



COUNTA

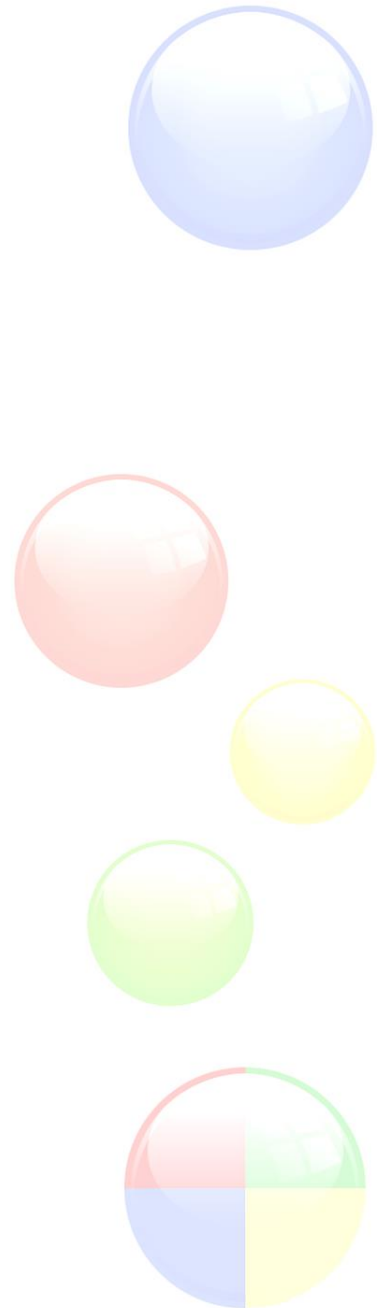
Now in cell C13 we will put "COUNTA".

Make sure that the cell range is (A1:A8)

	100		
	Excel		
	300		
	100		
	100		
	50		
	9000		
	700		
	10350	=SUM(A1:A8)	
	50	=MIN(A1:A8)	
	9000	=MAX(A1:A8)	
	7	=COUNT(A1:A8)	
		=COUNTA(A1:A8)	

=COUNTA adds up the number of cells in a cell range that are not empty.

	100		
	Excel		
	300		
	100		
	100		
	50		
	9000		
	700		
	10350	=SUM(A1:A8)	
	50	=MIN(A1:A8)	
	9000	=MAX(A1:A8)	
	7	=COUNT(A1:A8)	
	8	=COUNTA(A1:A8)	



Now delete the contents of A3, and we will see that both COUNT formulas decrease.

A	B	C
100		
Excel		
100		
100		
50		
9000		
700		
10050	=SUM(A1:A8)	
50	=MIN(A1:A8)	
9000	=MAX(A1:A8)	
6	=COUNT(A1:A8)	
7	=COUNTA(A1:A8)	



COUNTBLANK

Now in cell C14 we will put "COUNTBLANK".

Make sure that the cell range is (A1:A8)

A	B	C
100		
Excel		
100		
100		
50		
9000		
700		
10050	=SUM(A1:A8)	
50	=MIN(A1:A8)	
9000	=MAX(A1:A8)	
6	=COUNT(A1:A8)	
7	=COUNTA(A1:A8)	
	=COUNTBLANK(A1:A8)	

=COUNTBLANK adds up the number of cells in a cell range that are empty (blank).

As there is only one blank cell in the cell range, this is what we should see.

A	B	C
100		
Excel		
100		
100		
50		
9000		
700		
10050	=SUM(A1:A8)	
50	=MIN(A1:A8)	
9000	=MAX(A1:A8)	
6	=COUNT(A1:A8)	
7	=COUNTA(A1:A8)	
1	=COUNTBLANK(A1:A8)	

SUMMARY

=SUM (Adds all the number in a Range of Cells)

=MIN (Returns the smallest number in set of values, ignores logical values and text)

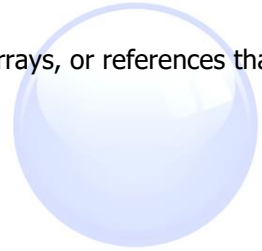
=MAX (Returns the largest value in set of numbers. Ignores logical values and text)

=AVERAGE (Returns the average (mean) of its arguments, which can be numbers, arrays, or references that contain numbers)

=COUNT (Counts the number of cells in a range that contain numbers)

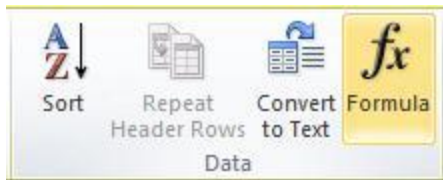
=COUNTA (Counts the number of cells in a range that are not empty)

=COUNTBLANK (Counts the number of cells in specified range of cells)



EXCEL HELP FILE

You can perform calculations and logical comparisons in a table by using formulas. The **Formula** command is found on the **Table Tools, Layout** tab, in the **Data** group.



A formula in Word automatically updates when you open the document that contains the formula. You can also update a formula result manually. For more information, see the section [update formula results](#).

Note: Formulas in Word or Outlook tables are a type of field code. For more information about field codes, see the [See Also](#) section.

Insert a formula in a table cell

1. Select the table cell where you want your result. If the cell is not empty, delete its contents.
2. On the **Table Tools, Layout** tab, in the **Data** group, click **Formula**.
3. Use the **Formula** dialog box to create your formula. You can type in the **Formula** box, select a number format from the **Number Format** list, and paste in functions and bookmarks using the **Paste Function** and **Paste Bookmark** lists.

Update formula results

In Word, the result of a formula is calculated when it is inserted, and when the document containing the formula opens. In Outlook, the result of a formula is only calculated when it is inserted and won't be available for the recipient of the email to edit.

You can also manually update:

- The result of one or more specific formulas
- The results of all formulas in a specific table
- All the field codes in a document, including formulas

Update the result of specific formulas

1. Select the formulas that you want to update. You can select multiple formulas by holding down the CTRL key while you make selections.
2. Do one of the following:
 - o Right-click the formula, then click **Update field**.
 - o Press F9.



Update all the formula results in a table

- Select the table that contains formula results that you want to update, and then press F9.

Update all the formulas in a document

Important: This procedure updates all the field codes in a document, not just formulas.

1. Press CTRL+A.
2. Press F9.



Examples: Sum numbers in a table by using positional arguments

You can use positional arguments (LEFT, RIGHT, ABOVE, BELOW) with these functions:

- AVERAGE
- COUNT
- MAX
- MIN
- PRODUCT
- SUM



As an example, consider the following procedure for adding numbers by using the SUM function and positional arguments.

Important: To avoid an error while summing in a table by using positional arguments, type a zero (0) in any empty cell that will be included in the calculation.

1. Select the table cell where you want your result. If the cell is not empty, delete its contents.
2. On the **Table Tools, Layout** tab, in the **Data** group, click **Formula**.
3. In the **Formula** dialog box, do one of the following:

To add the numbers... Type this in the **Formula** box

Above the cell =SUM(ABOVE)

Below the cell =SUM(BELOW)

Above and below the cell =SUM(ABOVE,BELOW)

Left of the cell =SUM(LEFT)

Right of the cell =SUM(RIGHT)

Left and right of the cell =SUM(LEFT,RIGHT)

Left of and above the cell =SUM(LEFT,ABOVE)

Right of and above the cell =SUM(RIGHT,ABOVE)

Left of and below the cell =SUM(LEFT,BELOW)



To add the numbers... Type this in the **Formula** box

Right of and below the cell =SUM(RIGHT,BELOW)

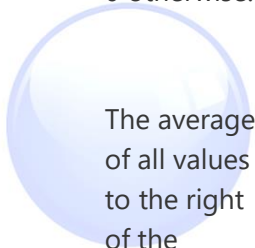

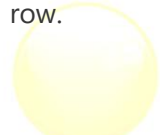


1. Click OK.

Available functions

Note: Formulas that use positional arguments (e.g., LEFT) do not include values in header rows.

The following functions are available for use in Word and Outlook table formulas:

Function	What it does	Example	Returns
ABS()	Calculates the absolute value of the value inside the parentheses	=ABS(-22)	22
AND()	Evaluates whether the arguments inside the parentheses are all TRUE.	=AND(SUM(LEFT)<10,SUM(ABOVE)>=5)	1, if the sum of the values to the left of the formula (in the same row) is less than 10 and the sum of the values above the formula (in the same column, excluding any header cell) is greater than

Function	What it does	Example	Returns
AVERAGE()	Calculates the average of items identified inside the parentheses.	=AVERAGE(RIGHT)	<p>or equal to 5; 0 otherwise.</p>  <p>The average of all values to the right of the formula cell, in the same row.</p>
COUNT()	Calculates the count of items identified inside the parentheses.	=COUNT(LEFT)	 <p>The number of values to the left of the formula cell, in the same row.</p> 
DEFINED()	Evaluates whether the argument inside the parentheses is defined. Returns 1 if the argument has been defined and evaluates without error, 0 if the argument has not been defined or returns an error.	=DEFINED(gross income)	 <p>1, if gross income has been defined and evaluates without error; 0 otherwise.</p> 
FALSE	Takes no arguments. Always returns 0.	=FALSE	0

Function	What it does	Example	Returns
IF()	Evaluates the first argument. Returns the second argument if the first argument is true; returns the third argument if the first argument is false.	=IF(SUM(LEFT)>=10,10,0)	10, if the sum of values to the left of the formula is at least 10; 0 otherwise.
	Note: Requires exactly three arguments.		
INT()	Rounds the value inside the parentheses down to the nearest integer.	=INT(5.67)	5
MAX()	Returns the maximum value of the items identified inside the parentheses.	=MAX(ABOVE)	The maximum value found in the cells above the formula (excluding any header rows).
MIN()	Returns the minimum value of the items identified inside the parentheses.	=MIN(ABOVE)	The minimum value found in the cells above the formula

Function	What it does	Example	Returns
			(excluding any header rows).
MOD()	Takes two arguments (must be numbers or evaluate to numbers). Returns the remainder after the second argument is divided by the first. If the remainder is 0 (zero), returns 0.0	=MOD(4,2)	0.0
NOT()	Takes one argument. Evaluates whether the argument is true. Returns 0 if the argument is true, 1 if the argument is false. Mostly used inside an IF formula.	=NOT(1=1)	0
OR()	Takes two arguments. If either is true, returns 1. If both are false, returns 0. Mostly used inside an IF formula.	=OR(1=1,1=5)	1

Function	What it does	Example	Returns
PRODUCT()	Calculates the product of items identified inside the parentheses.	=PRODUCT(LEFT)	The product of multiplying all the values found in the cells to the left of the formula.
ROUND()	Takes two arguments (first argument must be a number or evaluate to a number; second argument must be an integer or evaluate to an integer). Rounds the first argument to the number of digits specified by the second argument. If the second argument is greater than zero (0), first argument is rounded down to the specified number of digits. If second argument is zero (0), first argument is rounded down to the nearest integer. If second argument is negative, first argument is rounded down to	<p>=ROUND(123.456, 2)</p> <p>=ROUND(123.456, 0)</p> <p>=ROUND(123.456, -2)</p>	<p>123.46</p> <p>123</p> <p>100</p>

Function	What it does	Example	Returns
	the left of the decimal.		
SIGN()	Takes one argument that must either be a number or evaluate to a number. Evaluates whether the item identified inside the parentheses if greater than, equal to, or less than zero (0). Returns 1 if greater than zero, 0 if zero, -1 if less than zero.	=SIGN(-11)	-1
SUM()	Calculates the sum of items identified inside the parentheses.	=SUM(RIGHT)	The sum of the values of the cells to the right of the formula.
TRUE()	Takes one argument. Evaluates whether the argument is true. Returns 1 if the argument is true, 0 if the argument is false. Mostly used inside an IF formula.	=TRUE(1=0)	0

Use bookmarknames or cell references in a formula

You can refer to a bookmarked cell by using its bookmarkname in a formula. For example, if you have bookmarked a cell that contains or evaluates to a number with the bookmarkname **gross income**, the formula =ROUND(**gross_income**,0) rounds the value of that cell down to the nearest integer.

You can also use column and row references in a formula. There are two reference styles: RnCn and A1.

Note: The cell that contains the formula is not included in a calculation that uses a reference. If the cell is part of the reference, it is ignored.

RnCn references

You can refer to a table row, column, or cell in a formula by using the RnCn reference convention. In this convention, Rn refers to the nth row, and Cn refers to the nth column. For example, R1C2 refers to the cell that is in first row and the second column. The following table contains examples of this reference style.

To refer to...	...use this reference style
An entire column	Cn
An entire row	Rn
A specific cell	RnCn
The row that contains the formula	R
The column that contains the formula	C
All the cells between two specified cells	RnCn:RnCn

To refer to...

...use this reference style

A cell in a bookmarked table

Bookmarkname RnCn

A range of cells in a bookmarked table

Bookmarkname RnCn:RnCn



A1 references

You can refer to a cell, a set of cells, or a range of cells by using the A1 reference convention. In this convention, the letter refers to the cell's column and the number refers to the cell's row. The first column in a table is column A; the first row is row 1. The following table contains examples of this reference style.

To refer to...

...use this reference

The cell in the first column and the second row

A2

The first two cells in the first row

A1:B1

All the cells in the first column and the first two cells in the second column

A1:B2

