

Functions

AVERAGE

1. For example, the AVERAGE function below calculates the average of the numbers in cells A1 through A3.

<div> <div>A4</div> <div>✕ ✓ <i>f_x</i></div> <div>=AVERAGE(A1:A3)</div> </div>									
	A	B	C	D	E	F	G	H	I
1	8								
2	4								
3	9								
4	7								
5									

2. The formula below produces the exact same result.

<div> <div>A4</div> <div>✕ ✓ <i>f_x</i></div> <div>=SUM(A1:A3)/COUNT(A1:A3)</div> </div>									
	A	B	C	D	E	F	G	H	I
1	8								
2	4								
3	9								
4	7								
5									

3. The following AVERAGE function calculates the average of the numbers in cells A1 through A3 and the number 8.

<div> <div>A4</div> <div>✕ ✓ <i>f_x</i></div> <div>=AVERAGE(A1:A3,8)</div> </div>									
	A	B	C	D	E	F	G	H	I
1	8								
2	4								
3	9								
4	7.25								
5									

4. The AVERAGE function ignores logical values (TRUE or FALSE), empty cells and cells that contain text.

<div> <div>A7</div> <div>✕ ✓ <i>f_x</i></div> <div>=AVERAGE(A1:A6)</div> </div>									
	A	B	C	D	E	F	G	H	I
1	8								
2	4								
3	9								
4	TRUE								
5									
6	USA								
7	7								
8									

MAX

This example teaches you how to find the cell address of the maximum value in a column.

1. First, we use the MAX function to find the maximum value in column A.

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

MIN

To find the minimum value, use the MIN function.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	0	7	8	6	5	9	8	7	4	8	0	3	5	6	8	
2																
3	0															
4																

SUM

Most of the time, you'll use the SUM function in Excel to sum a range of cells.

	A	B	C	D	E	F	G	H	I
1	11								
2	24		Sum	107					
3	9								
4	13								
5	1								
6	8								
7	26								
8	15								
9									

SUM ENTIRE COLUMN

You can also use the SUM function in Excel to sum an entire column.

D2 ✕ ✓ <i>f_x</i> =SUM(A:A)									
	A	B	C	D	E	F	G	H	I
1	11								
2	24		Sum	108					
3	9								
4	13								
5	1								
6	8								
7	26								
8	15								
9									
98									
99	1								
100									

Note: you can also use the SUM function in Excel to sum an entire row. For example, =SUM(5:5) sums all values in the 5th row.

SUM NON-CONTIGUOUS CELLS

You can also use the SUM function in Excel to sum non-contiguous cells. Non-contiguous means not next to each other.

D2 ✕ ✓ <i>f_x</i> =SUM(A3,A5,A8)									
	A	B	C	D	E	F	G	H	I
1	11								
2	24		Sum	25					
3	9								
4	13								
5	1								
6	8								
7	26								
8	15								
9									

Note: =A3+A5+A8 produces the exact same result!

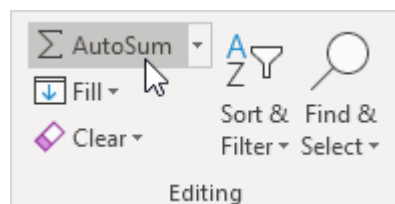
AUTOSUM

Use AutoSum or press ALT += to quickly sum a column or row of numbers.

1. First, select the cell below the column of numbers (or next to the row of numbers) you want to sum.

	A	B	C	D	E	F	G	H	I
1	11								
2	24								
3	9								
4	13								
5	1								
6	8								
7	26								
8	15								
9									
10									

2. On the Home tab, in the Editing group, click AutoSum (or press ALT +=).



3. Press Enter.

	A	B	C	D	E	F	G	H	I
1	11								
2	24								
3	9								
4	13								
5	1								
6	8								
7	26								
8	15								
9	107								
10									

SUM LARGEST NUMBERS

The SUM formula below uses the SUM and the LARGE function in Excel to sum the largest numbers in a range. Change {1,2,3,4} to {1,2,3,4,5} to sum the 5 largest numbers.

G (1,2,3,4) (1,2,3,4) (1,2,3,4)										
C1 {=SUM(LARGE(A1:A11,{1,2,3,4}))}										
	A	B	C	D	E	F	G	H	I	
1	5		46							
2	1									
3	6									
4	4									
5	2									
6	3									
7	10									
8	8									
9	22									
10	3									
11	5									
12										

Note: =LARGE(A1:A11,2) simply returns the second largest number.

SUM RANGE WITH ERRORS

The SUM formula below uses the SUM and the IFERROR function in Excel to sum a range with errors. You can also use the AGGREGATE function in Excel to sum a range with errors.

[illegible]

COUNT

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

A7									
	A	B	C	D	E	F	G	H	I
1	10								
2	1								
3	7								
4	20								
5	3								
6									
7	5								
8									

COUNTA

The COUNTA function counts the number of nonblank cells. COUNTA stands for count all.

A9									
	A	B	C	D	E	F	G	H	I
1	2								
2	sun								
3	moon								
4	TRUE								
5									
6	7								
7	5								
8									
9	6								
10									

COUNT BLANK CELLS

1. The COUNTBLANK function counts the number of blank cells.

A9									
	A	B	C	D	E	F	G	H	I
1	2								
2	sun								
3	moon								
4	TRUE								
5									
6	7								
7	5								
8									
9	1								
10									

SIMPLE IF

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

1a. For example, take a look at the IF function in cell B2 below.

B2				✕ ✓ <i>fx</i>		=IF(A2>500,"High","Low")			
	A	B	C	D	E	F	G	H	I
1	Price	Result							
2	\$644	High							
3	\$911	High							
4	\$74	Low							
5	\$312	Low							
6	\$970	High							
7									

Explanation: if the price is greater than 500, the IF function returns High, else it returns Low.

1b. The following IF function produces the exact same result.

B2		✕ ✓ <i>fx</i>		=IF(A2<500,"Low","High")					
	A	B	C	D	E	F	G	H	I
1	Price	Result							
2	\$644	High							
3	\$911	High							
4	\$74	Low							
5	\$312	Low							
6	\$970	High							
7									

Note: you can use the following comparison operators: = (equal to), > (greater than), < (less than), >= (greater than or equal to), <= (less than or equal to) and <> (not equal to).

2. Always enclose text in double quotation marks.

B2				✕ ✓ <i>fx</i>		=IF(A2="USA",5,0)			
	A	B	C	D	E	F	G	H	I
1	Country	Result							
2	USA	5							
3	UK	0							
4	USA	5							
5	UK	0							
6	UK	0							
7									

3a. The formula below calculates the progress between two points in time.

C2		✕ ✓ fx		=B2-A2					
	A	B	C	D	E	F	G	H	I
1	Start	End	Progress						
2	17	119	102						
3	25	141	116						
4	13	131	118						
5	30		-30						
6	14	107	93						
7									

3b. You can use the IF function to display an empty string ("") if the end value hasn't been entered yet (see row 5).

C2		✕ ✓ fx		=IF(B2<>"",B2-A2,"")					
	A	B	C	D	E	F	G	H	I
1	Start	End	Progress						
2	17	119	102						
3	25	141	116						
4	13	131	118						
5	30								
6	14	107	93						
7									

Explanation: if the end value is not empty (<> means not equal to), the IF function calculates the progress between the start and end value, else it displays an empty string ("").

NESTED IF

The IF function in Excel can be nested, when you have multiple conditions to meet. The FALSE value is being replaced by another IF function to make a further test.

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

C2		✕ ✓ fx		=IF(B2=1,"Bad",IF(B2=2,"Good",IF(B2=3,"Excellent","Not Valid")))					
	A	B	C	D	E	F	G	H	I
1	Name	Score	Result						
2	Richard	3	Excellent						
3	Jennifer	1	Bad						
4	James	2	Good						
5	Lisa	25	Not Valid						
6	Sharon	2	Good						
7									

Explanation: if the score equals 1, the nested IF formula returns Bad, if the score equals 2, the nested IF formula returns Good, if the score equals 3, the nested IF formula returns Excellent, else it returns Not Valid.

2. For example, take a look at the nested IF formula in cell C2 below.

C2		=IF(B2<60,"F",IF(B2<70,"D",IF(B2<80,"C",IF(B2<90,"B","A"))))							
	A	B	C	D	E	F	G	H	I
1	Name	Score	Grade						
2	Richard	41	F						
3	Jennifer	95	A						
4	James	82	B						
5	Lisa	73	C						
6	Sharon	60	D						
7									

Explanation: if the score is less than 60, the nested IF formula returns F, if the score is greater than or equal to 60 and less than 70, the formula returns D, if the score is greater than or equal to 70 and less than 80, the formula returns C, if the score is greater than or equal to 80 and less than 90, the formula returns B, else it returns A.

RIGHT

To extract the rightmost characters from a string, use the RIGHT function.

D1		=RIGHT(A1, 2)							
	A	B	C	D	E	F	G	H	I
1	example text			xt					
2									

LEFT

To extract the leftmost characters from a string, use the LEFT function.

D1		=LEFT(A1, 4)							
	A	B	C	D	E	F	G	H	I
1	example text			exam					
2									

MID

To extract a [substring](#), starting in the middle of a string, use the MID function.

D1		=MID(A1, 5, 3)							
	A	B	C	D	E	F	G	H	I
1	example text			ple					
2									

Note: started at position 5 (p) with length 3.

LEN

To get the length of a string, use the LEN function.

D1 : X ✓ fx =LEN(A1)									
	A	B	C	D	E	F	G	H	I
1	example text			12					
2									

Note: space (position 8) included!

LOWER/UPPER CASE

This example teaches you how to convert a text string to lower, upper or proper case in Excel.

1. Use the LOWER function to convert all letters in a text string to lowercase.

B1 : X ✓ fx =LOWER(A1)						
	A	B	C	D	E	F
1	Hi THERE, how are You?	hi there, how are you?				
2						

2. Use the UPPER function to convert all letters in a text string to uppercase.

B1 : X ✓ fx =UPPER(A1)						
	A	B	C	D	E	F
1	Hi THERE, how are You?	HI THERE, HOW ARE YOU?				
2						

CONCAT

The CONCAT function in Excel 2016 or later produces the exact same result as the CONCATENATE function. Simply replace CONCATENATE with CONCAT in the formulas shown above.

7. The CONCAT function can also join a range of strings. If you don't need a delimiter (space, comma, dash, etc.) this can be useful.

F1 : X ✓ fx =CONCAT(A1:E1)									
	A	B	C	D	E	F	G	H	I
1	+	1	415	648	5703	+14156485703			
2									

Concatenate

Use the CONCATENATE function in Excel to concatenate (join) strings. Instead of using CONCATENATE, simply use the & operator.

1. The CONCATENATE function below concatenates the string in cell A1 and the string in cell B1.

C1		✕ ✓ fx		=CONCATENATE(A1,B1)				
	A	B	C	D	E	F	G	H
1	Bears	Dolphins	BearsDolphins					
2								

2. Use the & operator to produce the exact same result.

C1		✕ ✓ fx		=A1 & B1				
	A	B	C	D	E	F	G	H
1	Bears	Dolphins	BearsDolphins					
2								

3. The CONCATENATE function below concatenates the string in cell A1, the string " and " (enclose text in double quotation marks) and the string in cell B1.

C1		✕ ✓ fx		=CONCATENATE(A1," and ",B1)				
	A	B	C	D	E	F	G	H
1	Bears	Dolphins	Bears and Dolphins					
2								

4. Use the & operator to produce the exact same result.

C1		✕ ✓ fx		=A1 & " and " & B1				
	A	B	C	D	E	F	G	H
1	Bears	Dolphins	Bears and Dolphins					
2								

5. The CONCATENATE function below concatenates the string in cell A1, a space and the string in cell B1.

C1		✕ ✓ fx		=CONCATENATE(A1," ",B1)				
	A	B	C	D	E	F	G	H
1	Tom	Brady	Tom Brady					
2								

6. Use the & operator to produce the exact same result.

C1		✕ ✓ fx		=A1 & " " & B1				
	A	B	C	D	E	F	G	H
1	Tom	Brady	Tom Brady					
2								

TEXTJOIN

The TEXTJOIN function in Excel 2016 or later joins a range of strings using a delimiter (first argument).

8. First, take a look at all the extra spaces in column E below when you drag the CONCATENATE function in cell E2 down to cell E11.

E2		✕ ✓ <i>fx</i>		=CONCATENATE(A2," ",B2," ",C2," ",D2)				
	A	B	C	D	E	F	G	H
1	Title	First Name	Middle Name	Last Name	Full Name			
2	Dr.	Tom	F.	Brady	Dr. Tom F. Brady			
3		Peyton		Manning	Peyton Manning			
4		Adrian	D.	Peterson	Adrian D. Peterson			
5	Mr.	Ray		Lewis	Mr. Ray Lewis			
6		Ed		Reed	Ed Reed			
7		Troy	E.	Polamalu	Troy E. Polamalu			
8		Andre		Johnson	Andre Johnson			
9		Darrelle		Revis	Darrelle Revis			
10	Dr.	Drew	Q.	Brees	Dr. Drew Q. Brees			
11		Julius		Peppers	Julius Peppers			
12								

9. The beauty of the TEXTJOIN function is that it can ignore empty cells (if the second argument is set to TRUE).

E2

✕

✓

fx

=TEXTJOIN(" ",TRUE,A2:D2)

	A	B	C	D	E	F	G	H
1	Title	First Name	Middle Name	Last Name	Full Name			
2	Dr.	Tom	F.	Brady	Dr. Tom F. Brady			
3		Peyton		Manning	Peyton Manning			
4		Adrian	D.	Peterson	Adrian D. Peterson			
5	Mr.	Ray		Lewis	Mr. Ray Lewis			
6		Ed		Reed	Ed Reed			
7		Troy	E.	Polamalu	Troy E. Polamalu			
8		Andre		Johnson	Andre Johnson			
9		Darrelle		Revis	Darrelle Revis			
10	Dr.	Drew	Q.	Brees	Dr. Drew Q. Brees			
11		Julius		Peppers	Julius Peppers			
12								