

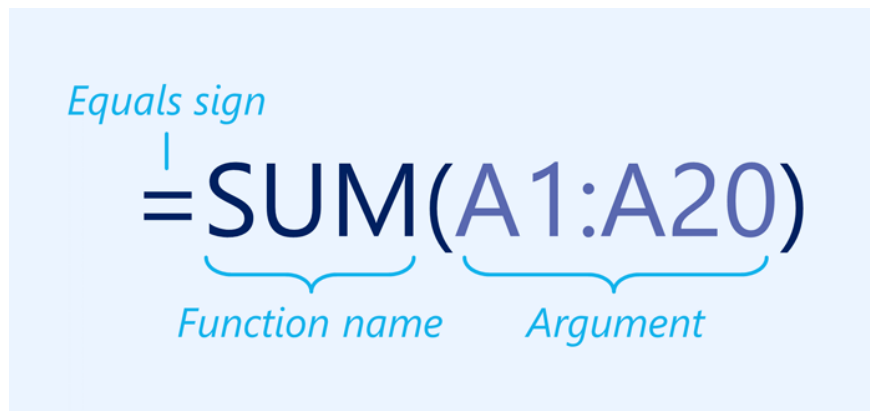
Excel 2019 (Part 15): Functions

Excel includes many common functions that can be used to quickly find the sum, average, count, maximum, and minimum values for a range of cells.

A function is a predefined formula that performs calculations using specific values in a particular order. Excel includes many common functions that can be used to quickly find the sum, average, count, maximum, and minimum values for a range of cells. To use functions correctly, you will need to understand the different parts of a function and how to create arguments to calculate values and cell references.

Parts of a function

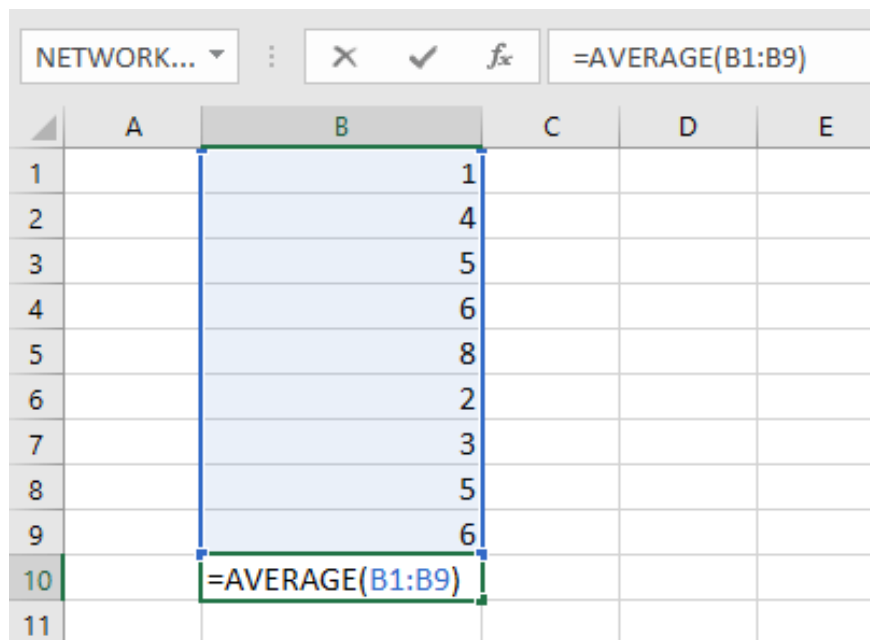
To function correctly, a function must be written in a specific way, known as syntax. The basic syntax for a function is an equals sign (=), a function name (e.g., **SUM**), and one or more arguments. The arguments contain the information you want to calculate. The function in the example below will add the values of the range of cells **A1:A20**.



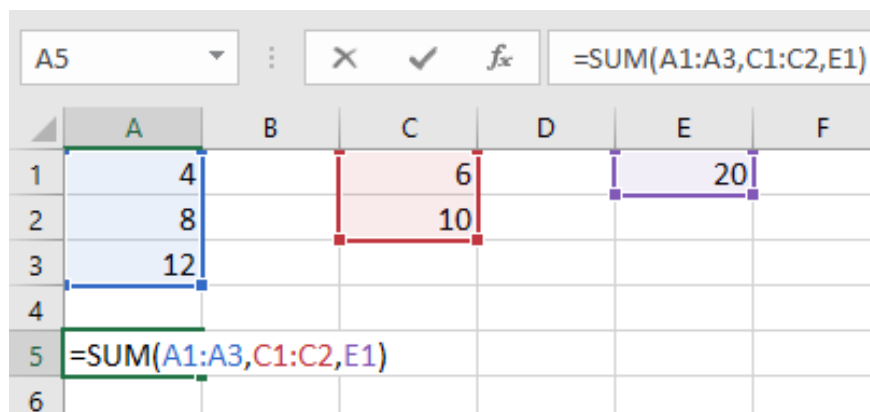
Working with arguments

Arguments can refer to both individual cells and cell ranges and must be enclosed in parentheses. You can include one or more arguments, depending on the syntax required for the function.

For example, the function `=AVERAGE(B1:B9)` will calculate the average of the values in the range **B1:B9**. This function only takes one argument.



Multiple arguments must be separated by commas. For example, the function `=SUM(A1:A3, C1:C2, E1)` will add the values of all cells in the 3 arguments.



Create a function

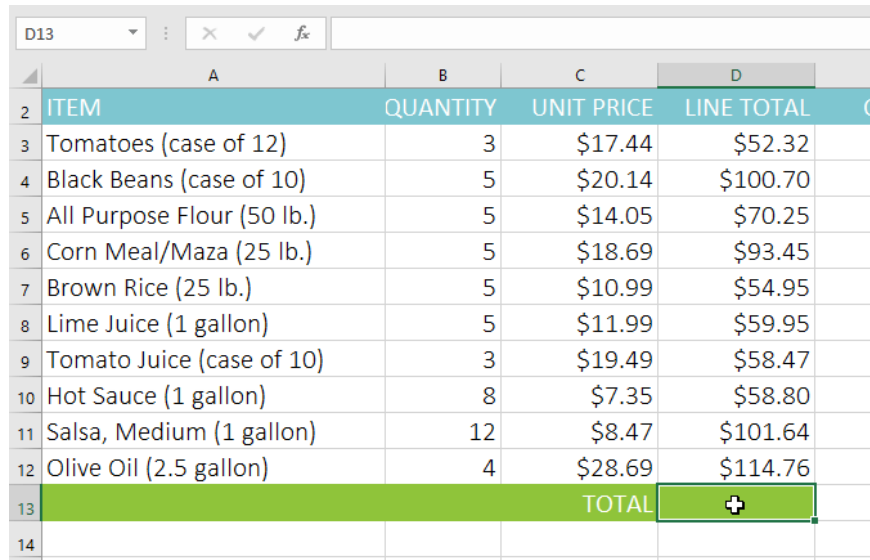
Excel has many built-in functions. Here are some of the most common ones you'll use:

1. **SUM** : This function adds all the values of the cells in the argument.
2. **AVERAGE** : This function determines the average value of the values in the argument. It sums the cells and then divides that value by the number of cells in the argument.
3. **COUNT** : This function counts the number of cells that contain numeric data in their arguments. This function is useful for quickly counting items within a range of cells.
4. **MAX** : This function determines the highest cell value in the argument.
5. **MIN**: This function determines the lowest cell value in the argument.

How to create a function using the AutoSum command

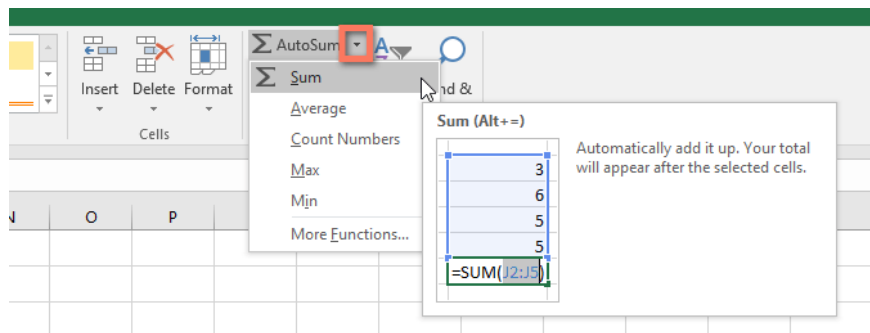
The AutoSum command allows you to automatically insert the most common functions into your formulas, including **SUM**, **AVERAGE**, **COUNT**, **MAX**, and **MIN**. The example below will use the SUM function to calculate the total cost for a list of recently ordered items.

1. Select the cell that will contain the function. For example, we would select cell **D13**.



	A	B	C	D
2	ITEM	QUANTITY	UNIT PRICE	LINE TOTAL
3	Tomatoes (case of 12)	3	\$17.44	\$52.32
4	Black Beans (case of 10)	5	\$20.14	\$100.70
5	All Purpose Flour (50 lb.)	5	\$14.05	\$70.25
6	Corn Meal/Maza (25 lb.)	5	\$18.69	\$93.45
7	Brown Rice (25 lb.)	5	\$10.99	\$54.95
8	Lime Juice (1 gallon)	5	\$11.99	\$59.95
9	Tomato Juice (case of 10)	3	\$19.49	\$58.47
10	Hot Sauce (1 gallon)	8	\$7.35	\$58.80
11	Salsa, Medium (1 gallon)	12	\$8.47	\$101.64
12	Olive Oil (2.5 gallon)	4	\$28.69	\$114.76
13			TOTAL	+
14				

2. In the **Editing** group on the **Home** tab, click the arrow next to the **AutoSum** command. Next, select the desired function from the drop-down menu. For example, we will select **Sum**.



3. Excel will place the function in the cell and automatically select a range of cells for the argument. In the example, cells **D3:D12** were automatically selected, and their values ??will be added to calculate the total cost. If Excel selects the wrong range of cells, you can manually enter the desired cells into the argument.

	A	B	C	D
2	ITEM	QUANTITY	UNIT PRICE	LINE TOTAL
3	Tomatoes (case of 12)	3	\$17.44	\$52.32
4	Black Beans (case of 10)	5	\$20.14	\$100.70
5	All Purpose Flour (50 lb.)	5	\$14.05	\$70.25
6	Corn Meal/Maza (25 lb.)	5	\$18.69	\$93.45
7	Brown Rice (25 lb.)	5	\$10.99	\$54.95
8	Lime Juice (1 gallon)	5	\$11.99	\$59.95
9	Tomato Juice (case of 10)	3	\$19.49	\$58.47
10	Hot Sauce (1 gallon)	8	\$7.35	\$58.80
11	Salsa, Medium (1 gallon)	12	\$8.47	\$101.64
12	Olive Oil (2.5 gallon)	4	\$28.69	\$114.76
13				=SUM(D3:D12)
14				SUM(number1, [number2], ...)

4. Press **Enter** on the keyboard. The function will be calculated and the result will appear in the cell. In the example, the sum of **D3:D12** is **\$765.29**.

	A	B	C	D
2	ITEM	QUANTITY	UNIT PRICE	LINE TOTAL
3	Tomatoes (case of 12)	3	\$17.44	\$52.32
4	Black Beans (case of 10)	5	\$20.14	\$100.70
5	All Purpose Flour (50 lb.)	5	\$14.05	\$70.25
6	Corn Meal/Maza (25 lb.)	5	\$18.69	\$93.45
7	Brown Rice (25 lb.)	5	\$10.99	\$54.95
8	Lime Juice (1 gallon)	5	\$11.99	\$59.95
9	Tomato Juice (case of 10)	3	\$19.49	\$58.47
10	Hot Sauce (1 gallon)	8	\$7.35	\$58.80
11	Salsa, Medium (1 gallon)	12	\$8.47	\$101.64
12	Olive Oil (2.5 gallon)	4	\$28.69	\$114.76
13	TOTAL			\$765.29
14				

The AutoSum command can also be accessed from the **Formulas** tab on **the Ribbon**.

The screenshot shows the Microsoft Excel ribbon with the **Formulas** tab selected. The **AutoSum** dropdown menu is open, displaying options: **Sum**, **Average**, **Count Numbers**, **Max**, **Min**, and **More Functions...**. The spreadsheet below shows the same data as the previous images, with the formula bar displaying **=SUM(D3:D12)**.

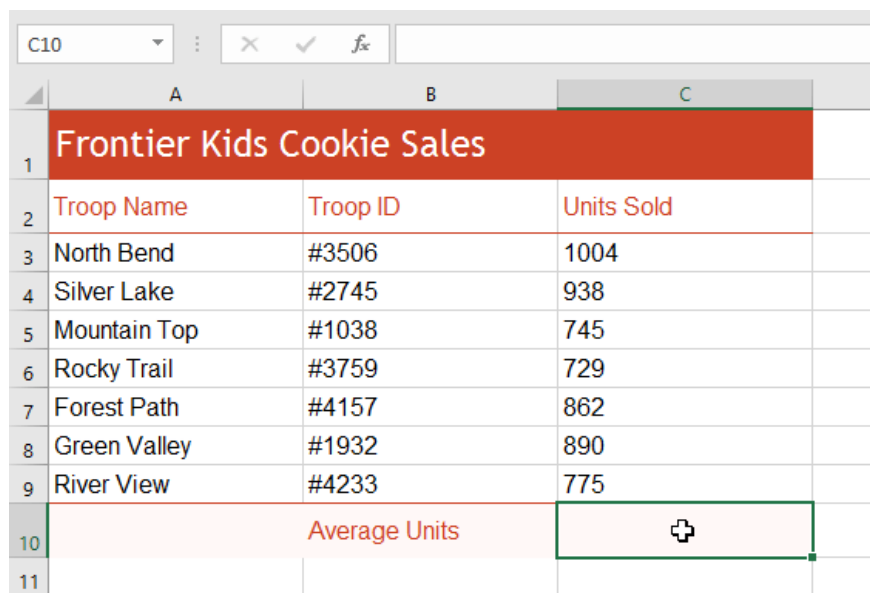
You can also use the keyboard shortcut **Alt + =** instead of the **AutoSum command**. To use this shortcut, hold down the **Alt** key and then press the equals sign.

Watch the video below to see how this shortcut works.

How to manually enter a function

If you already know the function name, you can easily type it yourself. In the example below (counting cookie sales), the **AVERAGE** function will be used to calculate the average number of units sold by each team.

1. Select the cell that will contain the function. For example, we would select cell **C10**.



Frontier Kids Cookie Sales		
Troop Name	Troop ID	Units Sold
North Bend	#3506	1004
Silver Lake	#2745	938
Mountain Top	#1038	745
Rocky Trail	#3759	729
Forest Path	#4157	862
Green Valley	#1932	890
River View	#4233	775
Average Units		+

2. Enter the equals sign (=), then enter the desired function name. You can also select the desired function from the list of suggested functions that appear below the cell as you type. For example, you would enter **=AVERAGE**.

Frontier Kids Cookie Sales		
Troop Name	Troop ID	Units Sold
North Bend	#3506	1004
Silver Lake	#2745	938
Mountain Top	#1038	745
Rocky Trail	#3759	729
Forest Path	#4157	862
Green Valley	#1932	890
River View	#4233	775
Average Units		=AVERAGE

Formula Bar: NETWORK... : X ✓ f_x =AVERAGE

Cell C10: =AVERAGE

Tooltip: Returns the average of the numbers in the range. Returns the average of the numbers in the range.

- AVERAGE
- AVERAGEA
- AVERAGEIF
- AVERAGEIFS

3. Enter the range of cells for the argument inside the parentheses. For example, you would enter **(C3:C9)**. This formula will add the value of cells **C3:C9**, then divide that value by the total number of values in the range.

Frontier Kids Cookie Sales		
Troop Name	Troop ID	Units Sold
North Bend	#3506	1004
Silver Lake	#2745	938
Mountain Top	#1038	745
Rocky Trail	#3759	729
Forest Path	#4157	862
Green Valley	#1932	890
River View	#4233	775
Average Units		=AVERAGE(C3:C9)

Formula Bar: C10 : X ✓ f_x =AVERAGE(C3:C9)

4. Press **Enter** on the keyboard. The function will be calculated and the result will appear in the cell. In the example, the average number sold by each team is **849**.

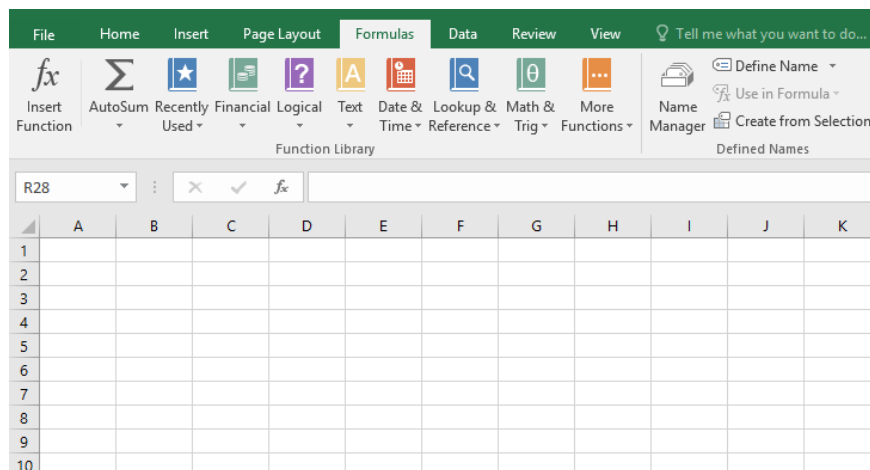
Frontier Kids Cookie Sales			
Troop Name	Troop ID	Units Sold	
North Bend	#3506	1004	
Silver Lake	#2745	938	
Mountain Top	#1038	745	
Rocky Trail	#3759	729	
Forest Path	#4157	862	
Green Valley	#1932	890	
River View	#4233	775	
Average Units		849	

Excel won't always tell you if your formula is wrong, so checking all your formulas will be up to you.

Function Library

Although Excel has hundreds of functions, the ones you'll use most often will depend on the type of data in your workbook. You don't need to learn every single one, but exploring some of the different types of functions will be helpful when you create new projects. You can even use **the Function Library** on the **Formulas** tab to browse functions by category, including **Financial, Logical, Text, and Date & Time**.

To access **the Function Library**, select the **Formulas** tab on **the Ribbon**. Find **the Function Library group**.



How to insert a function from the Function Library

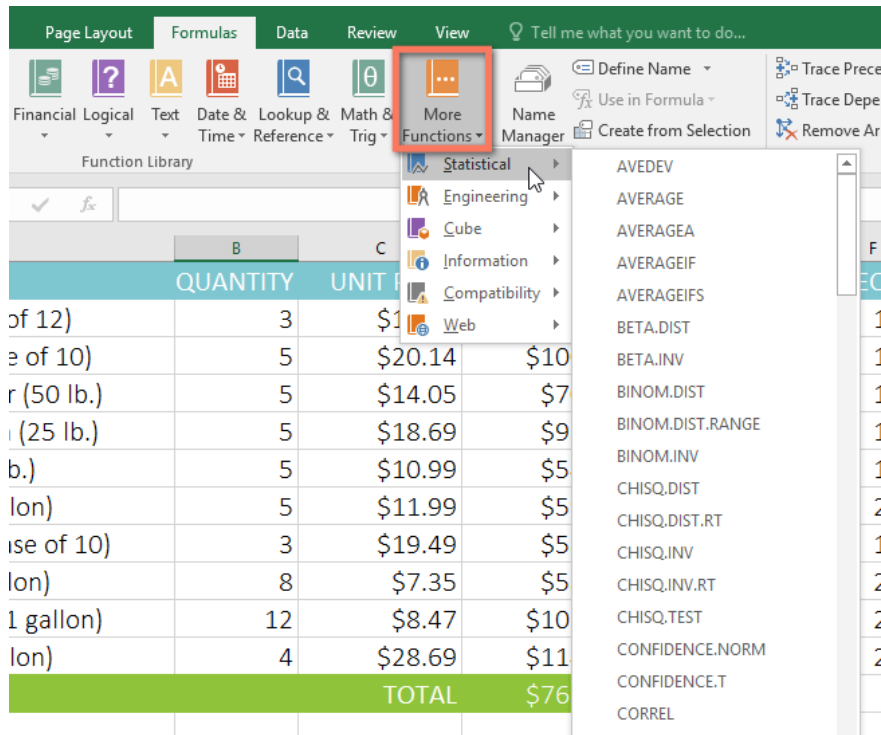
The example below will use the COUNTA function to count the total number of items in the Items column. Unlike COUNT, COUNTA can be used to count cells containing data of any type, not just numerical data.

1. Select the cell that will contain the function. For example, we would select cell **B17**.

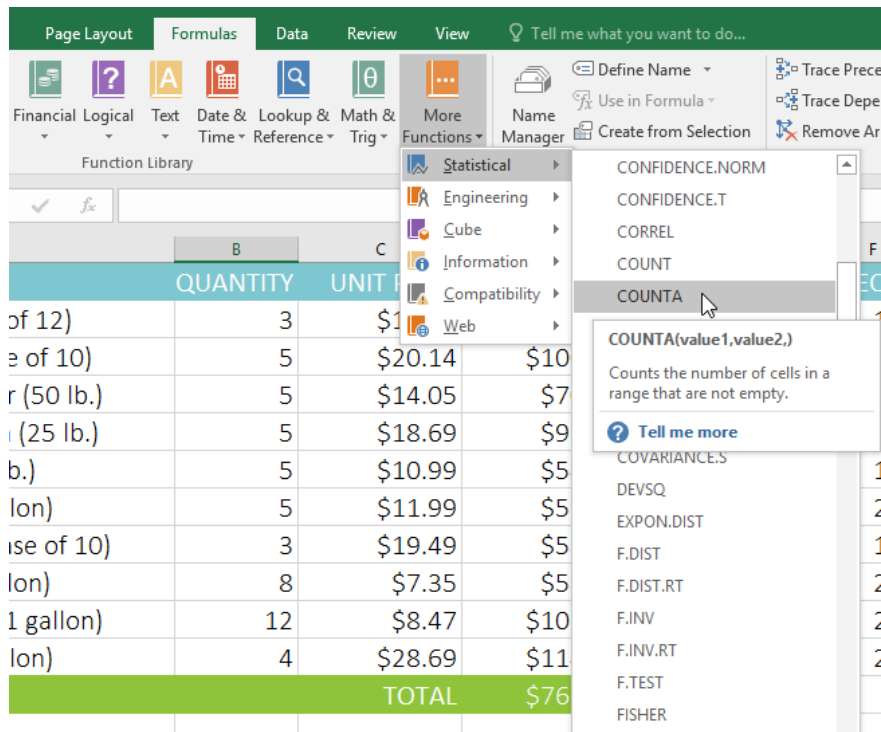
	A	B	C	D
2	ITEM	QUANTITY	UNIT PRICE	LINE TOTAL
3	Tomatoes (case of 12)	3	\$17.44	\$52.32
4	Black Beans (case of 10)	5	\$20.14	\$100.70
5	All Purpose Flour (50 lb.)	5	\$14.05	\$70.25
6	Corn Meal/Maza (25 lb.)	5	\$18.69	\$93.45
7	Brown Rice (25 lb.)	5	\$10.99	\$54.95
8	Lime Juice (1 gallon)	5	\$11.99	\$59.95
9	Tomato Juice (case of 10)	3	\$19.49	\$58.47
10	Hot Sauce (1 gallon)	8	\$7.35	\$58.80
11	Salsa, Medium (1 gallon)	12	\$8.47	\$101.64
12	Olive Oil (2.5 gallon)	4	\$28.69	\$114.76
13			TOTAL	\$765.29
14				
15				
16	PURCHASE ORDER SUMMARY			
17	Total items ordered	+		
18	Most expensive item			
19	Average days in transit			
20				

2. Click the **Formulas** tab on the **Ribbon** to access the **Function Library**.

3. From the **Function Library** group, select the desired function category. For example, select **More Functions**, then hover over **Statistical**.

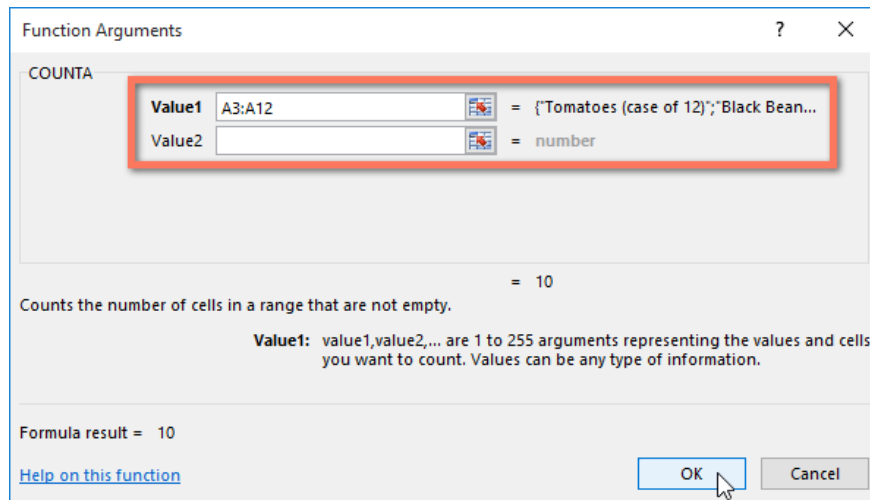


4. Select the desired function from the drop-down menu. For example, we would select the COUNTA function, which will count the number of cells in the **Items column**.



5. The **Function Arguments** dialog box will appear. Select the **Value1** field, then enter or select the desired cells. For example, we would enter the range of cells **A3:A12**. You can continue adding arguments in the **Value2** field, but in this case, the example only wants to count the number of cells in the range A3:A12.

6. When you are satisfied, click **OK**.



7. The function will be calculated and the result will appear in the cell. In the example, the result shows that 10 items have been ordered.

ITEM	QUANTITY	UNIT PRICE	LINE TOTAL
Tomatoes (case of 12)	3	\$17.44	\$52.32
Black Beans (case of 10)	5	\$20.14	\$100.70
All Purpose Flour (50 lb.)	5	\$14.05	\$70.25
Corn Meal/Maza (25 lb.)	5	\$18.69	\$93.45
Brown Rice (25 lb.)	5	\$10.99	\$54.95
Lime Juice (1 gallon)	5	\$11.99	\$59.95
Tomato Juice (case of 10)	3	\$19.49	\$58.47
Hot Sauce (1 gallon)	8	\$7.35	\$58.80
Salsa, Medium (1 gallon)	12	\$8.47	\$101.64
Olive Oil (2.5 gallon)	4	\$28.69	\$114.76
TOTAL			\$765.29
PURCHASE ORDER SUMMARY			
Total items ordered	10		
Most expensive item			
Average days in transit			

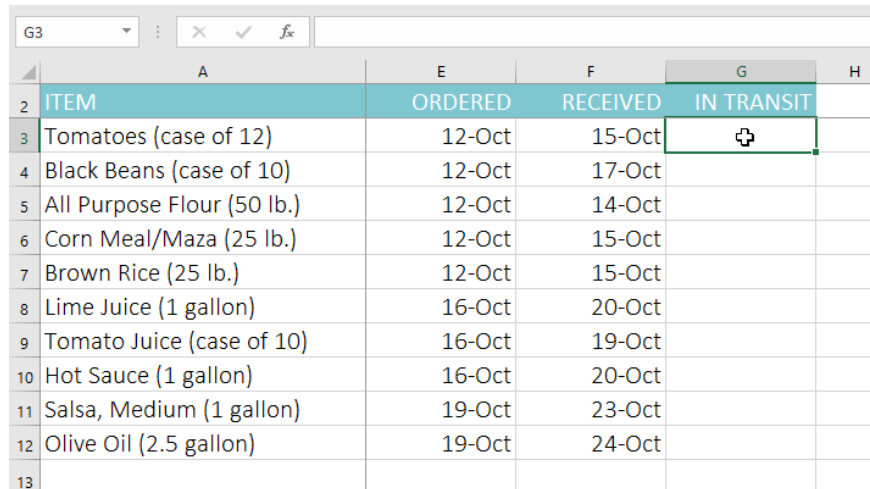
Insert Function command

While **the Function Library** is a great place to browse for functions, you might sometimes prefer searching for an alternative function. You can do so using the **Insert Function command**. It might take some trial and error depending on the type of function you're looking for, but in practice, the **Insert Function** command can be an efficient way to quickly find a function.

How to use the Insert Function command

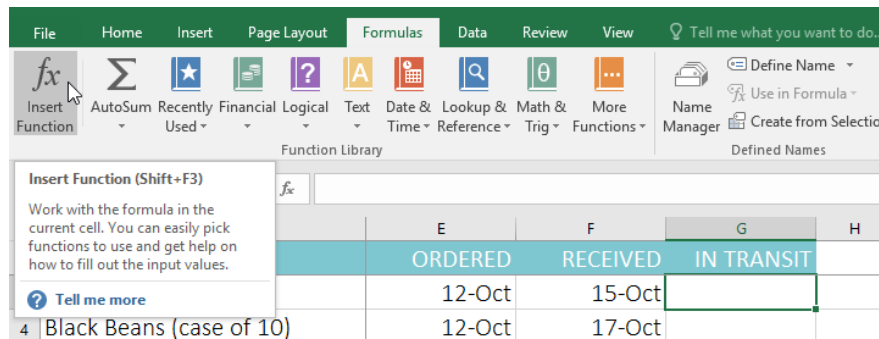
The example below seeks a function to calculate the number of days to receive items after placing an order. The example will use the dates in columns **E** and **F** to calculate the delivery time in column **G**.

1. Select the cell that will contain the function. For example, we would select cell **G3**.



	A	E	F	G	H
2	ITEM	ORDERED	RECEIVED	IN TRANSIT	
3	Tomatoes (case of 12)	12-Oct	15-Oct		
4	Black Beans (case of 10)	12-Oct	17-Oct		
5	All Purpose Flour (50 lb.)	12-Oct	14-Oct		
6	Corn Meal/Maza (25 lb.)	12-Oct	15-Oct		
7	Brown Rice (25 lb.)	12-Oct	15-Oct		
8	Lime Juice (1 gallon)	16-Oct	20-Oct		
9	Tomato Juice (case of 10)	16-Oct	19-Oct		
10	Hot Sauce (1 gallon)	16-Oct	20-Oct		
11	Salsa, Medium (1 gallon)	19-Oct	23-Oct		
12	Olive Oil (2.5 gallon)	19-Oct	24-Oct		
13					

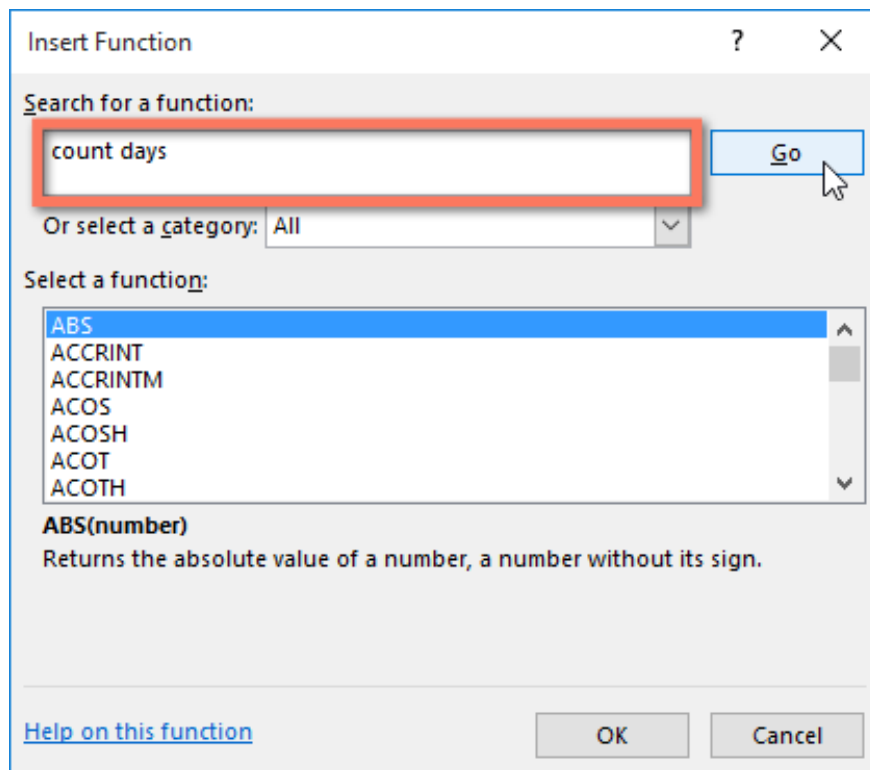
2. Click the **Formulas** tab on **the Ribbon**, then click the **Insert Function** command.



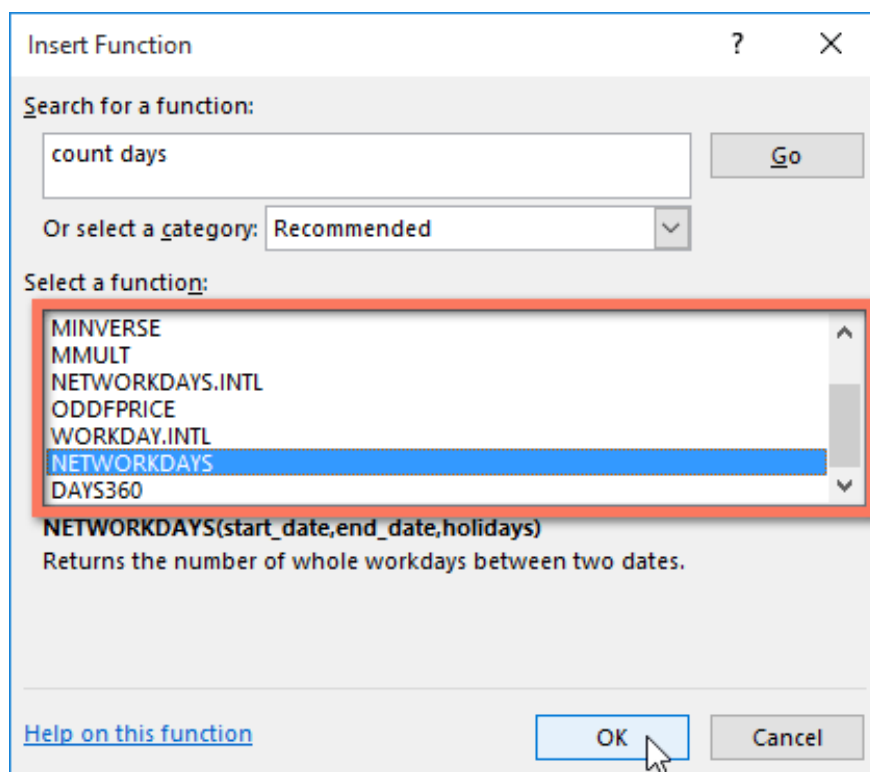
The screenshot shows the Excel ribbon with the **Formulas** tab selected. The **Insert Function** button is highlighted. Below the ribbon, the **Insert Function (Shift+F3)** dialog box is open, displaying instructions: "Work with the formula in the current cell. You can easily pick functions to use and get help on how to fill out the input values." The dialog box also includes a "Tell me more" link. In the background, the spreadsheet from the previous image is visible, with cell G3 selected.

3. The **Insert Function** dialog box will appear.

4. Enter a few keywords describing the calculation you want the function to perform, then click **Go**. For example, you would enter the number of days, but you can also search by selecting a category from the drop-down list.

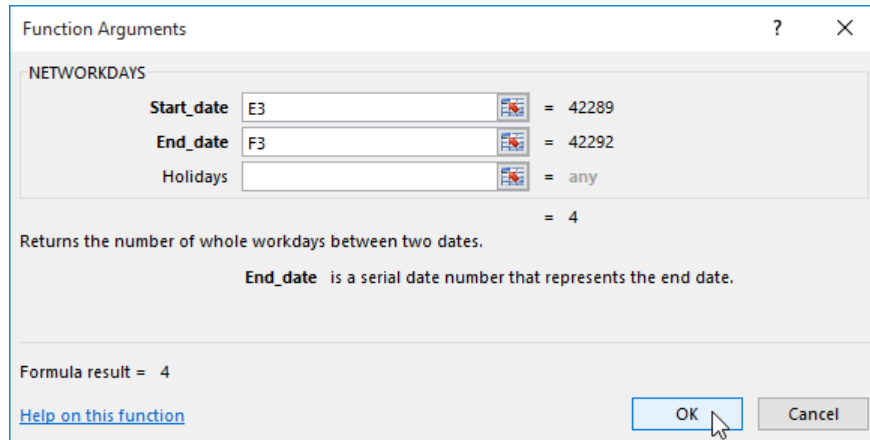


5. Review the results to find the desired function, then click **OK**. For example, we will select **NETWORKDAYS** to calculate the number of working days between the order date and the delivery date.



6. The **Function Arguments** dialog box will appear. From here, you can enter or select the cells that will form the arguments in the function. For example, you would enter **E3** in the **Start_date** field and **F3** in the **End_date** field.

7. When you are satisfied, click **OK**.



8. The function will be calculated and the result will appear in the cell. In the example, the result shows that it takes 4 business days to receive the order.

	A	E	F	G	H
2	ITEM	ORDERED	RECEIVED	IN TRANSIT	
3	Tomatoes (case of 12)	12-Oct	15-Oct	4	
4	Black Beans (case of 10)	12-Oct	17-Oct		
5	All Purpose Flour (50 lb.)	12-Oct	14-Oct		
6	Corn Meal/Maza (25 lb.)	12-Oct	15-Oct		
7	Brown Rice (25 lb.)	12-Oct	15-Oct		
8	Lime Juice (1 gallon)	16-Oct	20-Oct		
9	Tomato Juice (case of 10)	16-Oct	19-Oct		
10	Hot Sauce (1 gallon)	16-Oct	20-Oct		
11	Salsa, Medium (1 gallon)	19-Oct	23-Oct		
12	Olive Oil (2.5 gallon)	19-Oct	24-Oct		
13					

Like formulas, functions can be copied to adjacent cells. Simply select the cell containing the function, then click and drag the fill handle of the cells you want to fill. The function will be copied, and the values ??for those cells will be calculated relative to their rows or columns.

	A	E	F	G	H
2	ITEM	ORDERED	RECEIVED	IN TRANSIT	
3	Tomatoes (case of 12)	12-Oct	15-Oct	4	
4	Black Beans (case of 10)	12-Oct	17-Oct		
5	All Purpose Flour (50 lb.)	12-Oct	14-Oct		
6	Corn Meal/Maza (25 lb.)	12-Oct	15-Oct		
7	Brown Rice (25 lb.)	12-Oct	15-Oct		
8	Lime Juice (1 gallon)	16-Oct	20-Oct		
9	Tomato Juice (case of 10)	16-Oct	19-Oct		
10	Hot Sauce (1 gallon)	16-Oct	20-Oct		
11	Salsa, Medium (1 gallon)	19-Oct	23-Oct		
12	Olive Oil (2.5 gallon)	19-Oct	24-Oct		
13					

If you're comfortable with basic functions, you might want to try a more advanced one like the VLOOKUP function. Refer back to [TipsMake.com](https://tipsmake.com)'s article on how to use the VLOOKUP function in Excel for more information.

You finished reading the article "**Excel 2019 (Part 15): Functions**" edited by the [TipsMake](https://tipsmake.com) team. We hope this article has provided you with many useful tech tips and tricks. You can search for similar articles on tips and guides. Thank you for reading and for following us regularly.