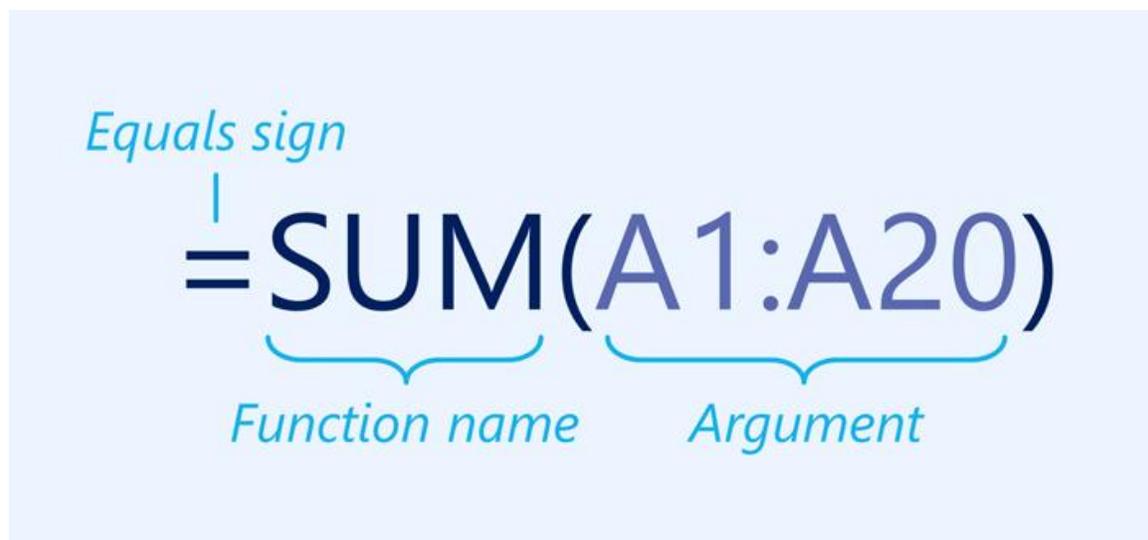


Functions

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 value, and minimum value for a range of cells. In order to use functions correctly, you'll need to understand the different parts of a function and how to create arguments to calculate values and cell references.

The parts of a function

In order to work correctly, a function must be written a specific way, which is called the **syntax**. The basic syntax for a function is the **equals sign (=)**, the **function name** (SUM, for example), and one or more **arguments**. Arguments contain the information you want to calculate. The function in the example below would add the values of the cell range A1:A20.



Working with arguments

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

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

	A	B	C	D	E
1		1			
2		4			
3		5			
4		6			
5		8			
6		2			
7		3			
8		5			
9		6			
10		=AVERAGE(B1:B9)			
11					

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

	A	B	C	D	E	F
1	4		6		20	
2	8		10			
3	12					
4						
5	=SUM(A1:A3,C1:C2,E1)					
6						

Creating a function

There are a variety of functions available in Excel. Here are some of the most common functions you'll use:

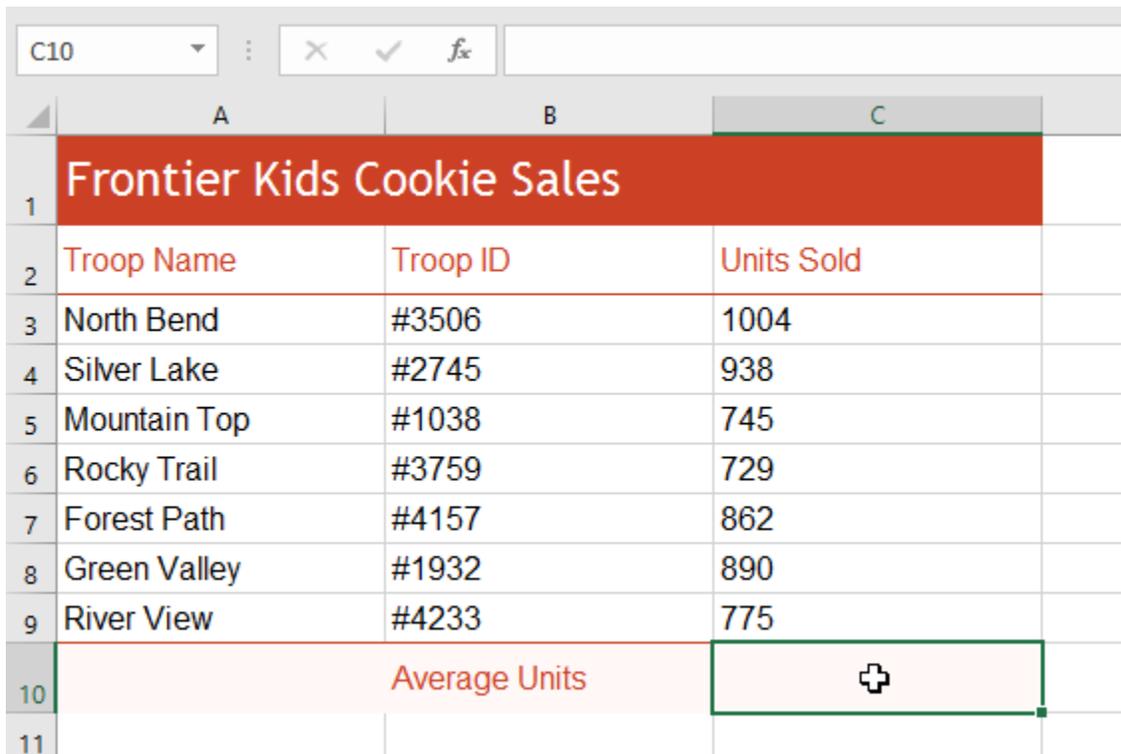
- **SUM:** This function **adds** all of the values of the cells in the argument.
- **AVERAGE:** This function determines the **average** of the values included in the argument. It calculates the sum of the cells and then divides that value by the number of cells in the argument.
- **COUNT:** This function **counts** the number of cells with numerical data in the argument. This function is useful for quickly counting items in a cell range.
- **MAX:** This function determines the **highest cell value** included in the argument.

- **MIN:** This function determines the **lowest cell value** included in the argument.

To enter a function manually:

If you already know the function name, you can easily type it yourself. In the example below (a tally of cookie sales), we'll use the **AVERAGE** function to calculate the **average number of units sold** by each troop.

1. Select the **cell** that will contain the function. In our example, we'll 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. Type the **equals sign (=)**, then enter the desired **function name**. You can also select the desired function from the list of **suggested functions** that appears below the cell as you type. In our example, we'll type **=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

NETWORK... : X ✓ f_x =AVERAGE
 A B C
 1
 2
 3
 4
 5
 6
 7
 8
 9
 10
 11
 12
 13
 14

Returns the average of the numbers in the array of values. If the array contains text or empty cells, they are ignored.

- AVERAGE
- AVERAGEA
- AVERAGEIF
- AVERAGEIFS

- Enter the **cell range** for the argument inside **parentheses**. In our example, we'll type **(C3:C9)**. This formula will add the values 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)

- Press **Enter** on your keyboard. The function will be calculated, and the **result** will appear in the cell. In our example, the average number of units sold by each troop is **849**.

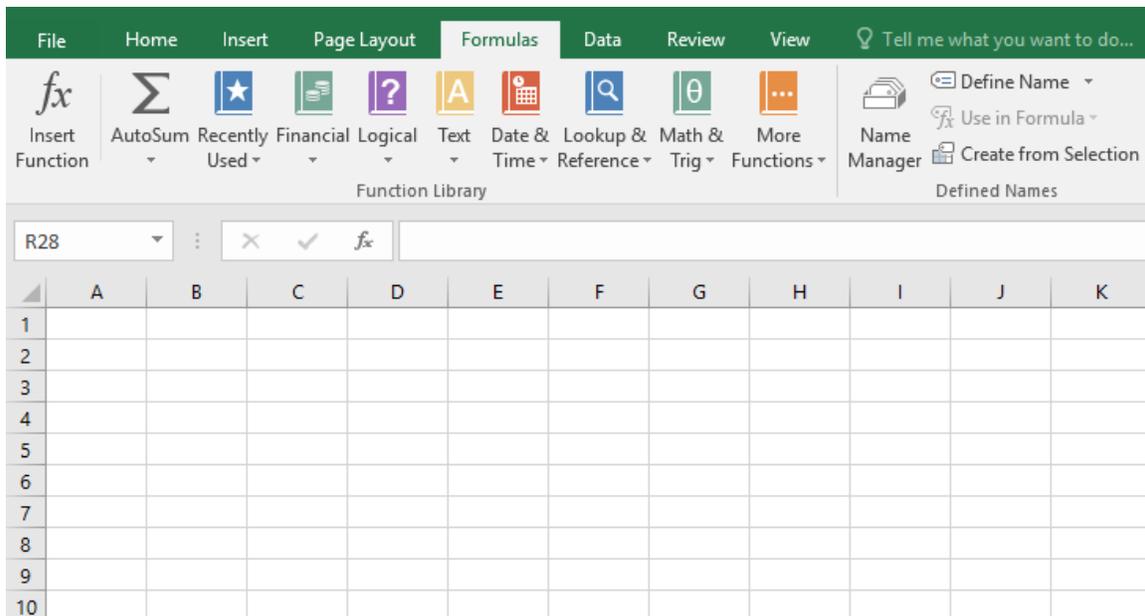
Frontier Kids Cookie Sales		
Troop Name	Troop ID	Units Sold
North Bend	#3506	1004
Silver Lake	#2745	938
Mountain Top	#1038	745
Rocky Trail	#3759	729
Forest Path	#4157	862
Green Valley	#1932	890
River View	#4233	775
Average Units		849

The Function Library

While there are hundreds of functions in Excel, the ones you'll use the most will depend on the **type of data** your workbooks contain. There's no need to learn every single function, but exploring some of the different **types** of functions will help as 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**. Look for the **Function Library** group.

Click the buttons in the interactive below to learn more about the different types of functions in Excel.



To insert a function from the Function Library:

In the example below, we'll use the **COUNTA** function to count the total number of items in the **Items** column. Unlike **COUNT**, **COUNTA** can be used to tally cells that contain data of any kind, not just numerical data.

1. Select the **cell** that will contain the function. In our example, we'll select cell **B17**.

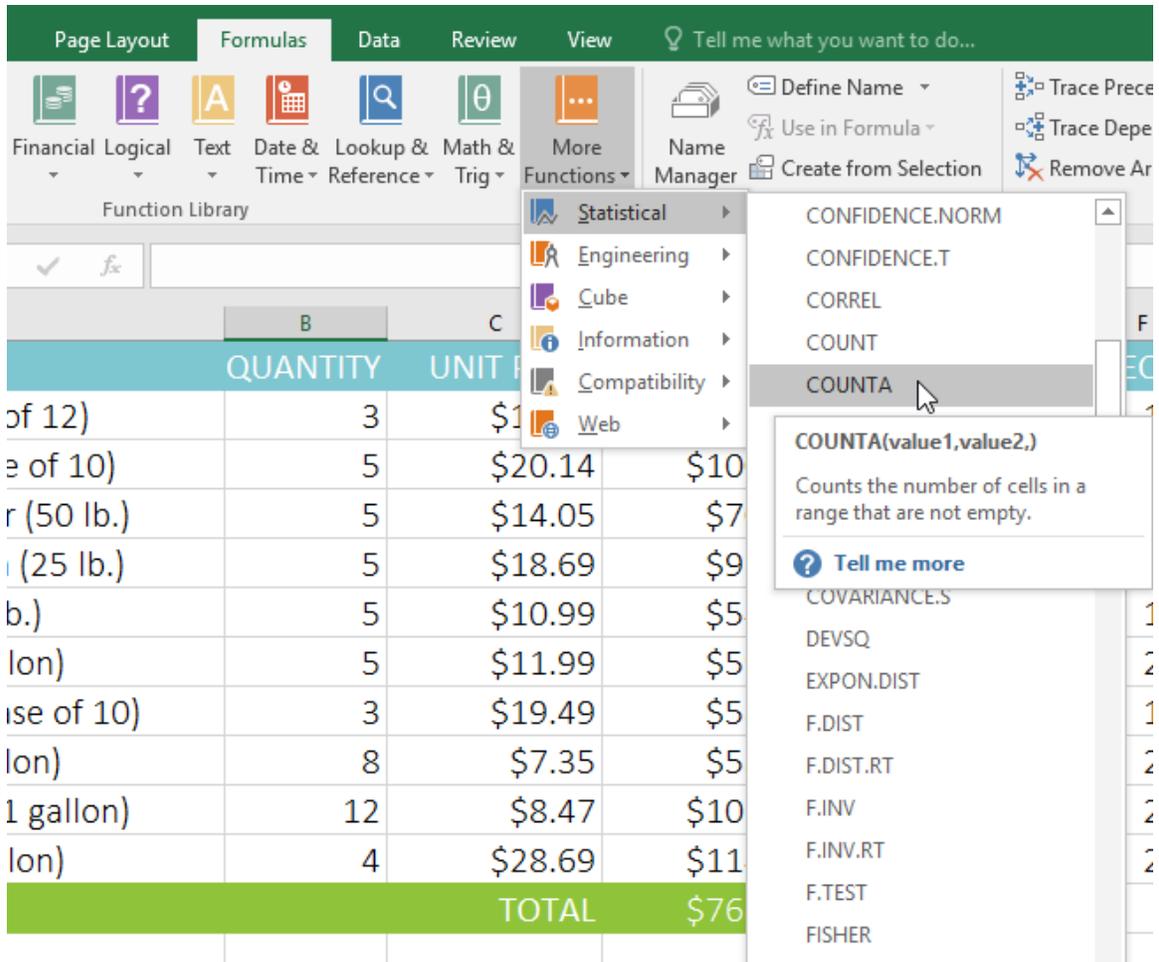
	A	B	C	D
2	ITEM	QUANTITY	UNIT PRICE	LINE TOTAL
3	Tomatoes (case of 12)	3	\$17.44	\$52.32
4	Black Beans (case of 10)	5	\$20.14	\$100.70
5	All Purpose Flour (50 lb.)	5	\$14.05	\$70.25
6	Corn Meal/Maza (25 lb.)	5	\$18.69	\$93.45
7	Brown Rice (25 lb.)	5	\$10.99	\$54.95
8	Lime Juice (1 gallon)	5	\$11.99	\$59.95
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**. In our example, we'll choose **More Functions**, then hover the mouse over **Statistical**.

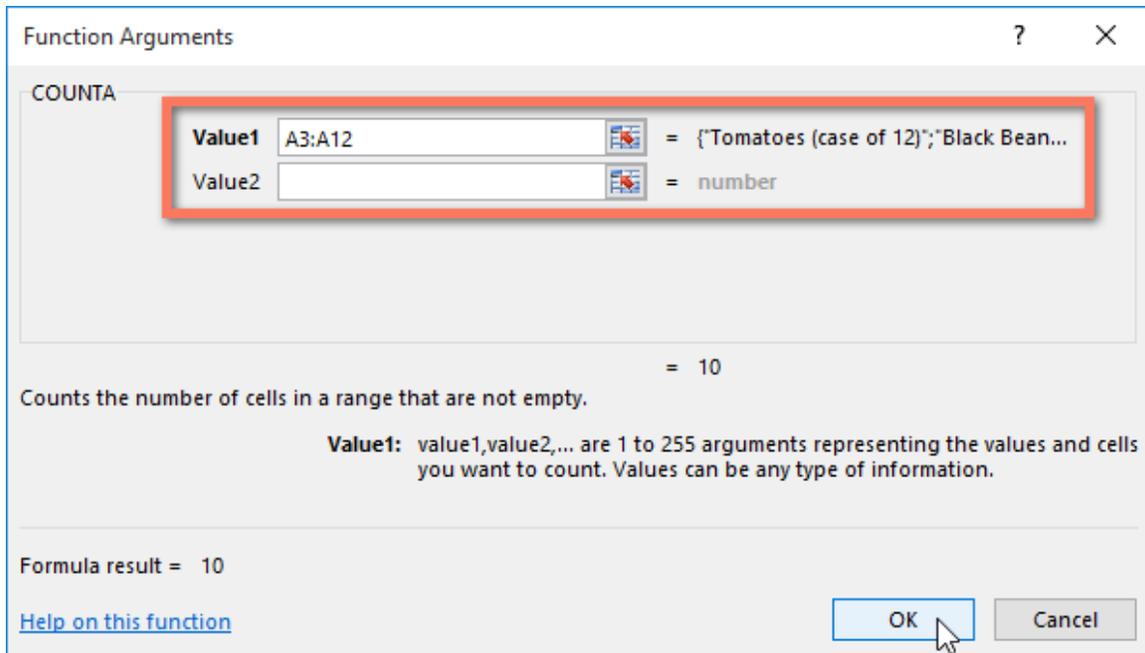
The screenshot shows the Microsoft Excel interface with the 'Formulas' ribbon selected. The 'More Functions' button is highlighted with a red box, and its dropdown menu is open. The menu lists several categories: Statistical, Engineering, Cube, Information, Compatibility, and Web. A list of specific functions is displayed on the right side of the dropdown menu, including AVEDEV, AVERAGE, AVERAGEA, AVERAGEIF, AVERAGEIFS, BETA.DIST, BETA.INV, BINOM.DIST, BINOM.DIST.RANGE, BINOM.INV, CHISQ.DIST, CHISQ.DIST.RT, CHISQ.INV, CHISQ.INV.RT, CHISQ.TEST, CONFIDENCE.NORM, CONFIDENCE.T, and CORREL.

	B	C		
	QUANTITY	UNIT		
of 12)	3	\$1		
e of 10)	5	\$20.14	\$10	
r (50 lb.)	5	\$14.05	\$7	
i (25 lb.)	5	\$18.69	\$9	
b.)	5	\$10.99	\$5	
lon)	5	\$11.99	\$5	
ise of 10)	3	\$19.49	\$5	
lon)	8	\$7.35	\$5	
1 gallon)	12	\$8.47	\$10	
lon)	4	\$28.69	\$11	
	TOTAL		\$76	

4. Select the **desired function** from the drop-down menu. In our example, we'll select the **COUNTA** function, which will count the number of cells in the **Items** column that are not empty.



5. The **Function Arguments** dialog box will appear. Select the **Value1** field, then enter or select the desired cells. In our example, we'll enter the cell range **A3:A12**. You can continue to add arguments in the **Value2** field, but in this case we only want to count the number of cells in the cell range **A3:A12**.
6. When you're satisfied, click **OK**.



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

B17 <input type="checkbox"/> <input checked="" type="checkbox"/> <i>fx</i> =COUNTA(A3:A12)				
	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
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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	10		
18	Most expensive item			
19	Average days in transit			
20				