



# Microsoft Office Virtual Learning

## Functions

May 14, 2020



Lesson: May 14, 2020

**Objective/Learning Target:**

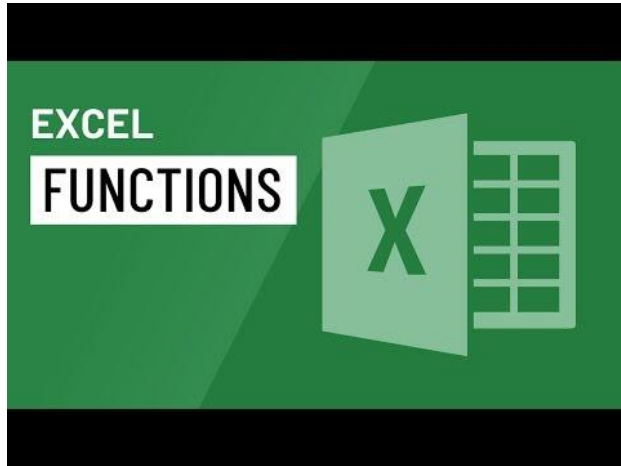
Students will will understand what functions are and how to use them in Excel and Google Sheets



# Introduction

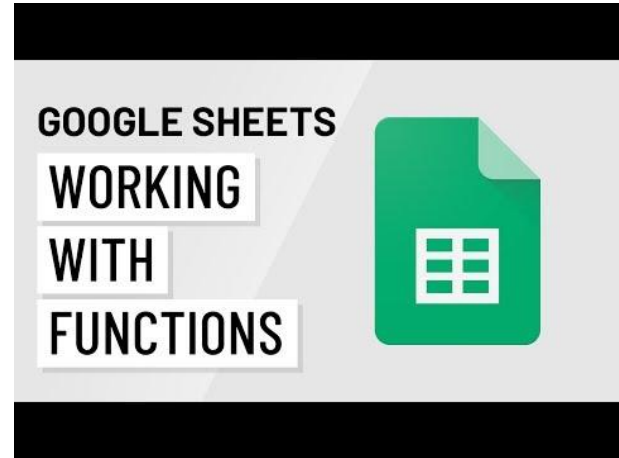
A **function** is a **predefined formula** that performs calculations using specific values in a particular order. Excel and google sheets includes many common functions that can be used to quickly find the **sum**, **average**, **count**, **maximum value**, and **minimum value** for a range of cells. 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.

## Excel



<https://youtu.be/-9d4m79twdA>

## Google Sheets



<https://youtu.be/IDpTGRjc9RE>



# The Parts of a Function

Similar to entering a formula, the order in which you enter a function into a cell is important. Each function has a specific order—called **syntax**—that must be followed in order for the function to calculate properly. The basic syntax to create a formula with a function is to insert an **equals sign (=)**, a **function name** (AVERAGE, for example, is the function name for finding an average), and an **argument**. Arguments contain the information you want the formula to calculate, such as a range of cell references.

*Equals sign*

**=SUM(A1:A20)**

*Function name*

*Argument*

# 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. (Excel - Left; Google Sheets - Right)

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		8			
5		2			
6		3			
7		5			
8		6			
9					
10		=AVERAGE(B1:B9)			
11					

	A	B	C
1		1	
2		4	
3		5	
4		8	
5		2	
6		3	
7		5	
8		6	
9			
10		=AVERAGE(B1:B9)	
11			
12			

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						

	A	B	C	D	E
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:

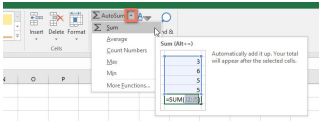
- SUM: This function adds all of the values of the cells in the argument.
- AVERAGE: This function determines the average of the values included in the argument. It calculates the sum of the cells and then divides that value by the number of cells in the argument.
- COUNT: This function counts the number 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 Create a Function Using the Functions Button

## Excel

The AutoSum command allows you to automatically insert the most common functions into your formula, including SUM, AVERAGE, COUNT, MIN, and MAX. In the example below, we'll 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. In our example, we'll select cell D13.
2. In the Editing group on the Home tab, click the arrow next to the AutoSum command. Next, choose the desired function from the drop-down menu. In our example, we'll select Sum.

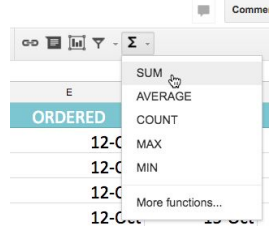


3. Excel will place the function in the cell and automatically select a cell range for the argument. In our example, cells D3:D12 were selected automatically; their values will be added to calculate the total cost. If Excel selects the wrong cell range, you can manually enter the desired cells into the argument.
4. Press Enter on your keyboard. The function will be calculated, and the result will appear in the cell. In our example, the sum of D3:D12 is \$765.29.

## Google Sheets

The Functions button allows you to automatically return the results for a range of cells. The answer will display in the cell below the range.

1. Select the range of cells you want to include in the argument. In our example, we'll select D3:D12.
2. Click the Functions button, then select the desired function from the drop-down menu. In our example, we'll select SUM.
3. In the cell directly below the selected cells, the function appears.
4. Press the Enter key on your keyboard. The function will be calculated, and the result will appear in the cell. In our example, the sum of D3:D12 is \$765.29.





# To Enter a Function Manually

If you already know the function name, you can easily type it yourself. In the example below, which is a tally of cookie sales, we'll use the AVERAGE function to calculate the average number of units sold by each troop. (Excel - Left; Google Sheets - Right)

1. Select the cell where the answer will appear. In our example, we'll select C10.
2. Type the equals sign (=), then type 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.

Excel screenshot showing the AVERAGE function being entered in cell C10. The formula bar shows =AVERAGE. A tooltip for the AVERAGE function is visible, stating: "Returns the average (arithmetic mean) of the arguments. Arguments can be numbers, names, arrays, cell references, or constants that contain numbers." The spreadsheet data is as follows:

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

Google Sheets screenshot showing the AVERAGE function being entered in cell C10. The formula bar shows =AVERAGE. A dropdown menu of suggested functions is visible, including AVERAGE, AVERAGEA, AVERAGEIF, and AVERAGEIFS. The spreadsheet data is as follows:

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

3. 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.

Excel screenshot showing the cell range C3:C9 entered in the AVERAGE function. The formula bar shows =AVERAGE(C3:C9). The spreadsheet data is as follows:

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

Google Sheets screenshot showing the cell range C3:C9 entered in the AVERAGE function. The formula bar shows =AVERAGE(C3:C9). The spreadsheet data is as follows:

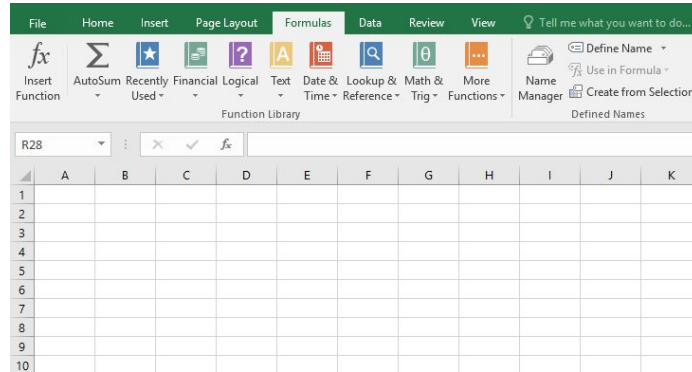
Troop Name	Troop ID	Units Sold
North Bend	#3506	1004
Silver Lake	#2745	938
Mountain Top	#1038	745
Rocky Trail	#3759	729
Forest Path	#4157	862
Green Valley	#1932	890
River View	#4233	775

4. Press the Enter key on your keyboard, and the answer appears.

# Excel 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 you as you create new projects. You can even use the Function Library on the Formulas tab to browse functions by category, such as Financial, Logical, Text, and Date & Time.

To access the Function Library, select the Formulas tab on the Ribbon. Look for the Function Library group.

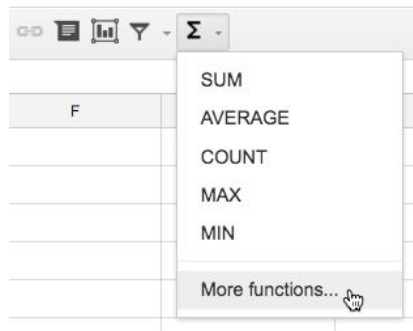




# Google Sheets Function List

If you have experience using spreadsheets and want to use Google Sheets to make more advanced calculations, you can explore the Google Sheets function list. It is a handy reference for hundreds of financial, statistical, and data analysis functions.

To access the function list, Click the Functions button and select More functions... from the drop-down menu. The Google sheets function list will appear in a new browser tab.



# Challenge

## Excel

1. Open Excel 2016.
2. Enter the following into the designated Cells

A1	10
A2	2
A3	5

3. Use the fill handle to copy the same numbers into cells B1 through B3 and C1 through C3
4. In cell A4, insert a function to calculate the average of the three scores in cells A1:A3.
5. Use the fill handle to copy the function in A4 to cells B4:C4

## Sheets

1. Open Google Sheets and create a new blank spreadsheet.
2. Enter the following into the designated Cells

A1	10
A2	2
A3	5

3. Use the fill handle to copy the same numbers into cells B1 through B3 and C1 through C3
4. In cell A4, enter a formula that multiplies B3, C3, and A3.
5. In cell A4, insert a function to calculate the average of the three scores in cells A1:A3.
6. Use the fill handle to copy the function in A4 to cells B4:C4

For More Resources:

Microsoft Excel:

<https://edu.gcfglobal.org/en/excel2016/functions/1/>

Google Sheets:

<https://edu.gcfglobal.org/en/googlespreadsheets/working-with-functions/1/>