



University Information  
Technology Services

# Microsoft Office

## Excel 2016 for Windows

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### Intro to Formulas & Basic Functions

University Information Technology Services

Learning Technologies, Training & Audiovisual Outreach

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# University Information Technology Services

## Microsoft Office: Excel 2016 for Windows

### Intro to Formulas and Basic Functions

#### Table of Contents

Introduction .....	4
Learning Objectives.....	4
Functions and Formulas.....	5
Basic Information .....	5
How to Specify Individual Cells .....	5
How to Specify a Group of Cells.....	5
Entering a Formula.....	6
Editing a Formula .....	7
Basic Functions.....	8
Insert Function Button .....	11
Auto Calculate .....	13
AutoSum.....	14
Additional Help .....	15

## **Introduction**

This booklet is the companion document to the Excel 2016: Intro to Formulas and Basic Functions workshop. It includes and definitions for formulas and functions, and covers the various aspects of creating formulas and the basic functions used in Excel.

## **Learning Objectives**

After completing the instructions in this booklet, you will be able to:

- Understand formulas
- Create formulas
- Understand functions
- Use basic functions
- Know the difference between formulas and functions

## Functions and Formulas

A formula performs calculations or other actions on the data in your worksheet. A function is a preset formula in Excel. It is important to understand the following information about functions and formulas.

### Basic Information

A formula and a function always begins with an equal sign (=). The data Excel will use to calculate a function is enclosed in parentheses (). Formulas do not include parentheses.

	<b>Formula</b>	
	=A1+A2+A3	
	<b>Function</b>	
	=SUM(A1:A3)	

Figure 1 - Formulas & Functions

### How to Specify Individual Cells

When there is a comma (,) between cell references in a function, Excel uses each cell to perform the calculation. For example, the function =SUM (A1, A2, A3) is the same as the formula =A1+A2+A3.

	<b>Function</b>	
	=SUM(A1,A2,A3)	

Figure 2 - Using Commas to Separate Cell References

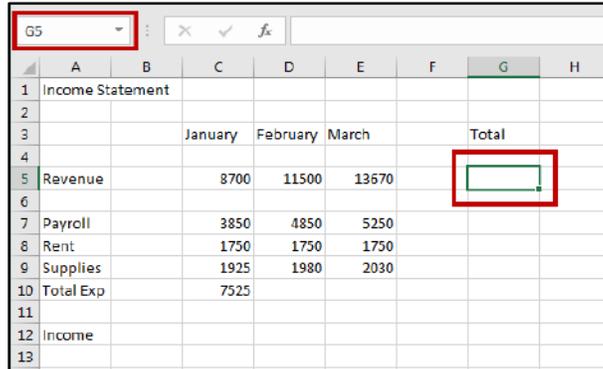
### How to Specify a Group of Cells

When there is a colon (:) between cell references in a function, Excel uses the specified cells and all cells between them to perform the calculation. For example, the function =SUM (A1:A3) is the same as the formula =A1+A2+A3 (See Figure 1).

## Entering a Formula

The following instructions explain how to enter a formula:

1. Click on the **cell** where you want to enter a formula. This is where the answer will appear. In Figure 3, cell G5 has been selected.



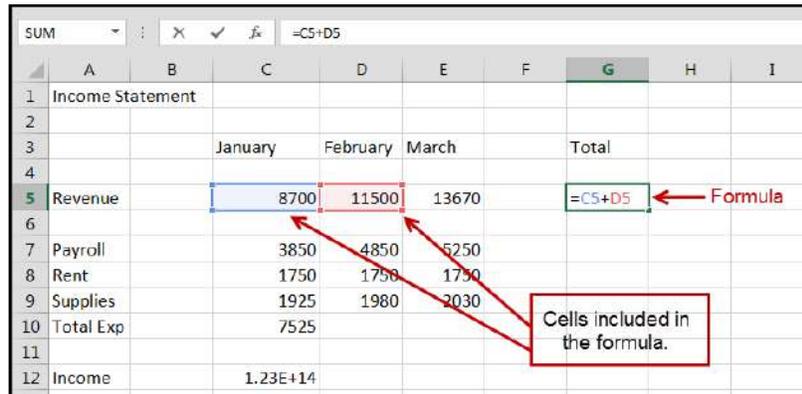
The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E	F	G	H	
1	Income Statement								
2									
3			January	February	March		Total		
4									
5	Revenue		8700	11500	13670				
6									
7	Payroll		3850	4850	5250				
8	Rent		1750	1750	1750				
9	Supplies		1925	1980	2030				
10	Total Exp		7525						
11									
12	Income								
13									

Cell G5 is highlighted with a red box. The formula bar at the top shows the formula  $=C5+D5$ .

Figure 3 - Select Cell for Formula

2. Type an **equal** sign (=) to begin the formula (See Figure 4).
3. Then type the **formula** (=C5+D5), (See Figure 4).

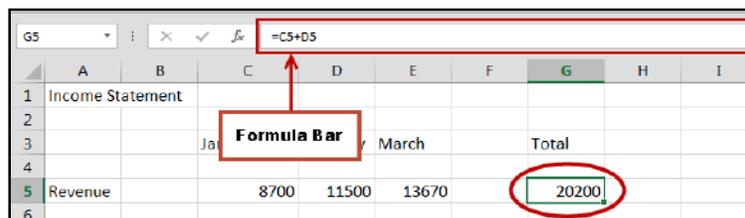


The screenshot shows the same Excel spreadsheet as Figure 3, but now the formula  $=C5+D5$  is entered in cell G5. Red arrows point from the formula bar to cells C5 and D5, with a text box that says "Cells included in the formula." A red arrow also points from the text "Formula" to the formula bar.

	A	B	C	D	E	F	G	H	I	
1	Income Statement									
2										
3			January	February	March		Total			
4										
5	Revenue		8700	11500	13670		$=C5+D5$			
6										
7	Payroll		3850	4850	5250					
8	Rent		1750	1750	1750					
9	Supplies		1925	1980	2030					
10	Total Exp		7525							
11										
12	Income		1.23E+14							

Figure 4 - Entering Formulas

4. Press **Enter**. The results of the calculation will appear in the selected cell (See Figure 5).
5. To view the formula, click the cell containing the formula and it will appear in the formula bar (See Figure 5).



The screenshot shows the same Excel spreadsheet as Figure 4, but now the formula bar displays  $=C5+D5$  and the result 20200 is displayed in cell G5. A red box highlights the formula bar, and a red circle highlights the result in cell G5. A red arrow points from the formula bar to cell G5.

	A	B	C	D	E	F	G	H	I	
1	Income Statement									
2										
3			January	February	March		Total			
4										
5	Revenue		8700	11500	13670		20200			
6										
7	Payroll		3850	4850	5250					
8	Rent		1750	1750	1750					
9	Supplies		1925	1980	2030					
10	Total Exp		7525							
11										
12	Income		1.23E+14							

Figure 5 - Formula Bar

## Editing a Formula

Sometimes you may need to change a formula to include additional cells, remove cells, etc. The following instructions explain how to edit a formula.

1. Click the **cell** containing the formula you want to edit. The formula will be shown inside the *formula bar* (See Figure 5).
2. Click inside the **formula bar** and make the necessary changes (in Figure 6, E5 was added to the formula).

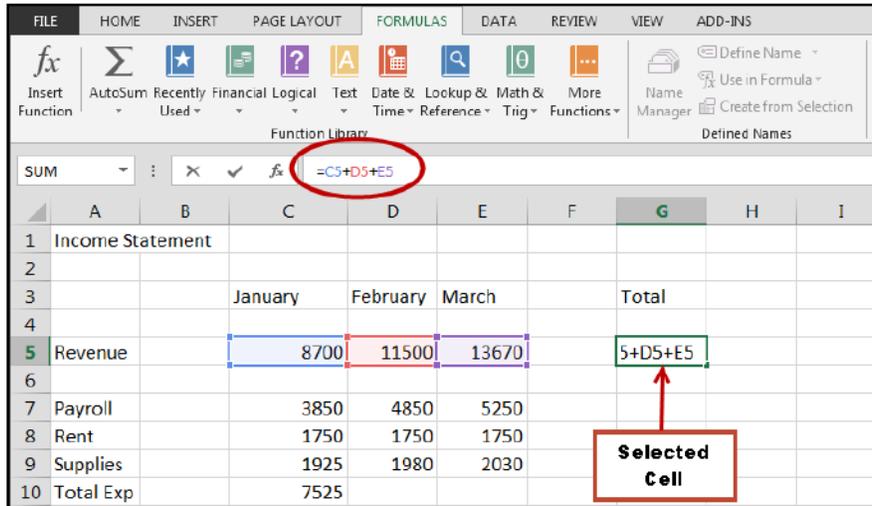


Figure 6 - Editing a Formula

3. When finished, press **Enter** on your keyboard. The answer will appear in the selected cell (See Figure 7).

The screenshot shows the same spreadsheet as Figure 6, but now the formula in cell G5 has been executed. The formula bar still shows  $=C5+D5+E5$ . The value 33870 is now displayed in cell G5, which is circled in red. The spreadsheet data is as follows:

	A	B	C	D	E	F	G	H
1	Income Statement							
2								
3			January	February	March		Total	
4								
5	Revenue		8700	11500	13670		33870	
6	Expenses:							
7	Payroll		3850	4850	5250			
8	Rent		1750	1750	1750			
9	Supplies		1925	1980	2030			
10	Total Exp		7525	8580	7000			

Figure 7 - Edited Formula

## Basic Functions

Functions let you perform calculations without typing long, complex formulas. The following instructions explain how to use some basic functions in Excel.

- **SUM** - Adds a list of numbers (See Figure 8).  
**Function** - =SUM(B3:B7) (See Figure 8).  
**Result** - 441.6 (See Figure 8).

	A	B	C	D	E	F
1	GRADES					
2						
3	Math	89				
4	History	75.6				
5	Science	82				
6	English	95				
7	Geography	100				
8						
9	Total Grade (SUM)	441.6				
10						
11						
12						

Figure 8 - Entering the SUM Function

- **AVERAGE** - Calculates the average value of a list of numbers (See Figure 9).  
**Function** - =AVERAGE(B3:B7) (See Figure 9).  
**Result** - 88.32 (See Figure 9).

	A	B	C	D	E	F
1	GRADES					
2						
3	Math	89				
4	History	75.6				
5	Science	82				
6	English	95				
7	Geography	100				
8						
9	Average	88.32				
10						
11						

Figure 9 - Entering the AVERAGE Function

- **MAX** - Finds the largest value in a list of numbers (See Figure 10).  
**Function** - =MAX(B3:B7) (See Figure 10)  
**Result** - 100 (See Figure 10)

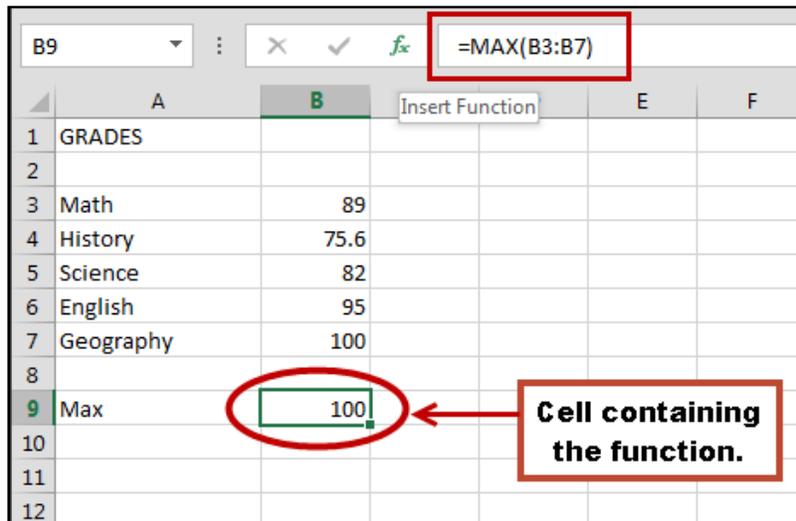


Figure 10 - Entering the MAX Function

- **MIN** - Finds the smallest value in a list of numbers (See Figure 11).  
**Function** - =MIN(B3:B7) (See Figure 11)  
**Result** - 75.6 (See Figure 11)

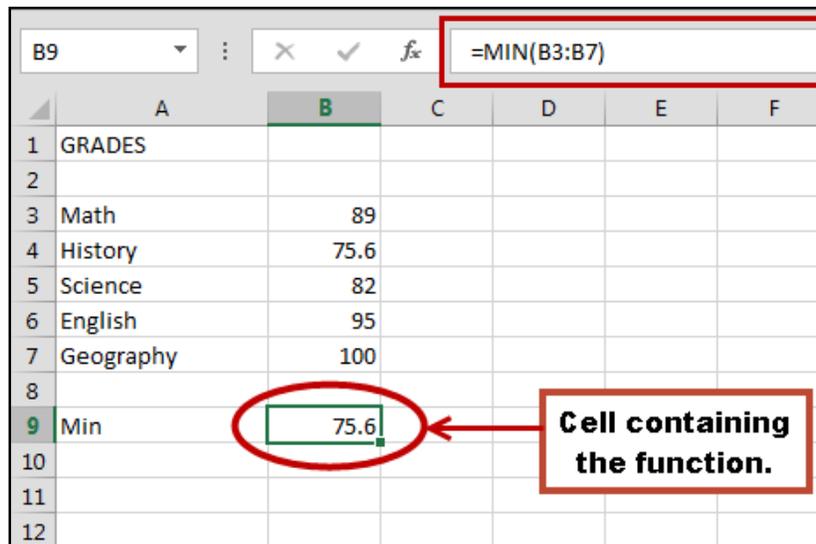


Figure 11 - Entering the MIN Function

- **COUNT** - Calculates the number of values in a list (See Figure 12).  
**Function** - =COUNT(B3:B7) (See Figure 12)  
**Result** - 5 (See Figure 12)

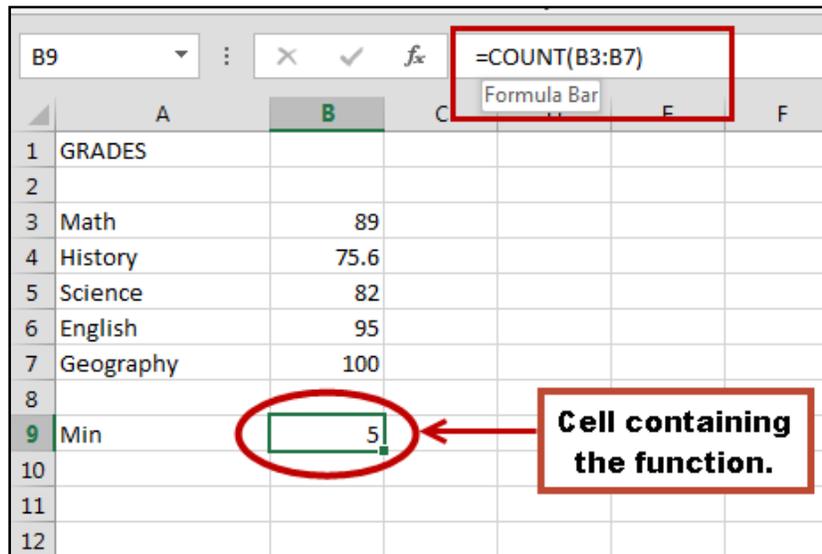


Figure 12 - Entering the COUNT Function

**Note:** COUNT will only count a cell if it contains numbers only. If used on cells with characters/letters, it will count that cell as empty.

- **ROUND** - Rounds a value to a specific number of digits (See Figure 13).  
**Function** - =ROUND(B9, 2) (See Figure 13)  
**Result** - 3.4 (See Figure 13)

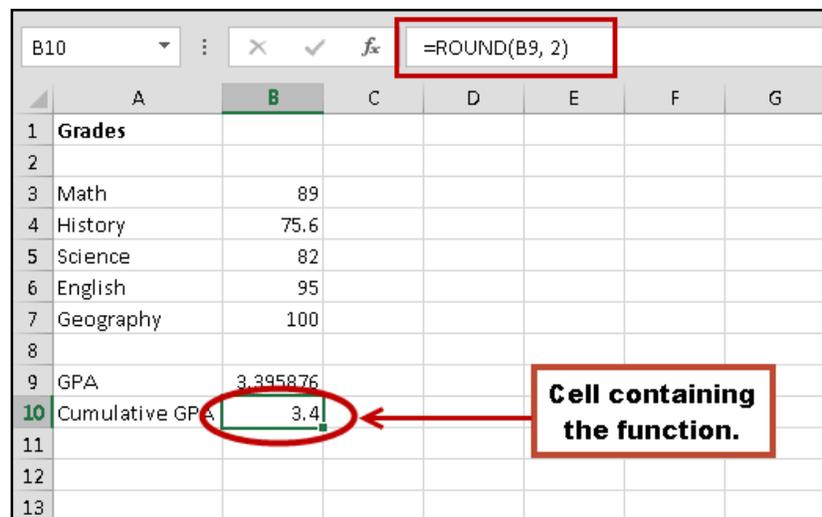
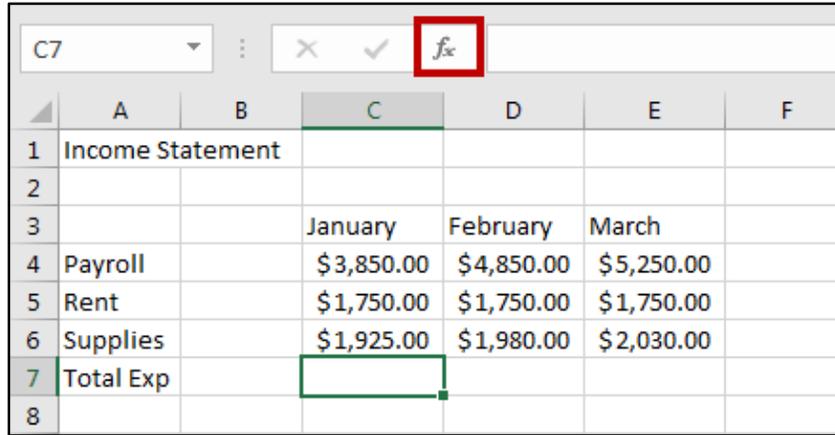


Figure 13 - Entering the ROUND Function

## Insert Function Button

The following explains how to use functions.

1. Click to select the **cell** where you want to enter the function on the worksheet.
2. Click the **Insert Function** button on the *Formula Bar*.



	A	B	C	D	E	F
1	Income Statement					
2						
3			January	February	March	
4	Payroll		\$3,850.00	\$4,850.00	\$5,250.00	
5	Rent		\$1,750.00	\$1,750.00	\$1,750.00	
6	Supplies		\$1,925.00	\$1,980.00	\$2,030.00	
7	Total Exp					
8						

Figure 14 – Insert Function Button

3. The *Insert Function* window will appear. In the *Select a Function* field, select a **Function** that you want to use (e.g. SUM) (See Figure 15).
4. A description, and example on how to use the function will be displayed (See Figure 15).
5. Click **OK** (See Figure 15).

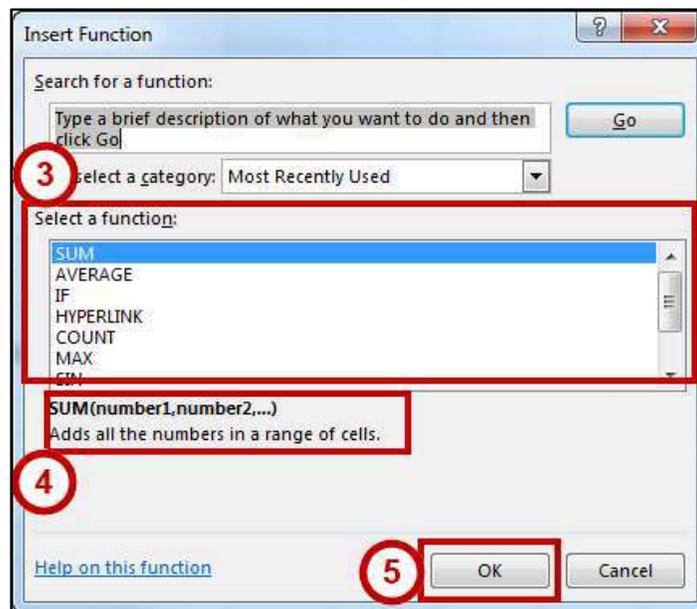


Figure 15 - Insert Function Window

**Note:** If needed, use the *Function Search* field to search for a function by typing in a description and clicking **Go**.

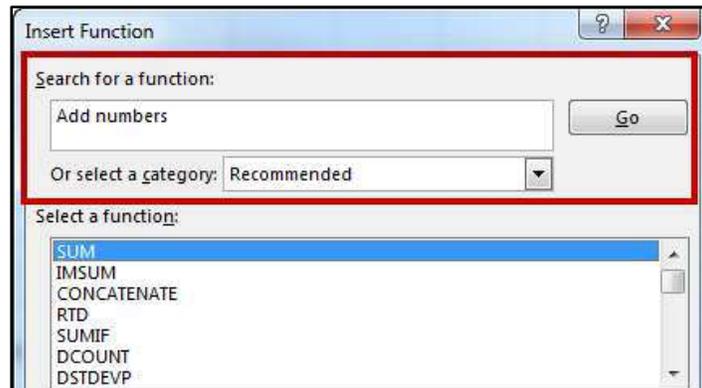


Figure 16 - Search for a Function

6. The *Function Arguments* window appears (See Figure 17).
7. In the *Number 1* field, enter the **cell(s)** that contain the data to be used in the formula (See Figure 17).

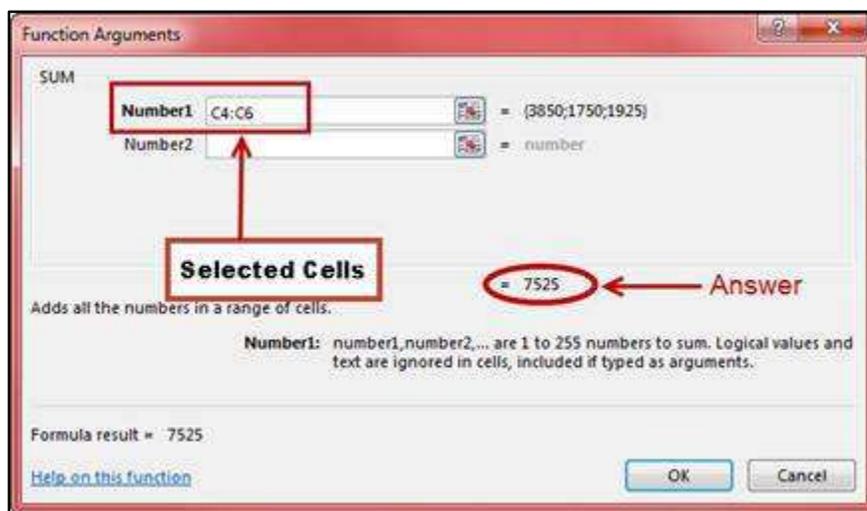


Figure 17 - Function Arguments Window

8. Click **OK**. The results of the formula will appear in the selected cell.

# Auto Calculate

The *auto-calculate* feature can be used to do quick calculations on data. The following explains how to use *auto calculate*.

1. Select the **cells** that you want to include in the calculation (See Figure 18).
2. The status bar will display the results of the cells that you selected (See Figure 18).

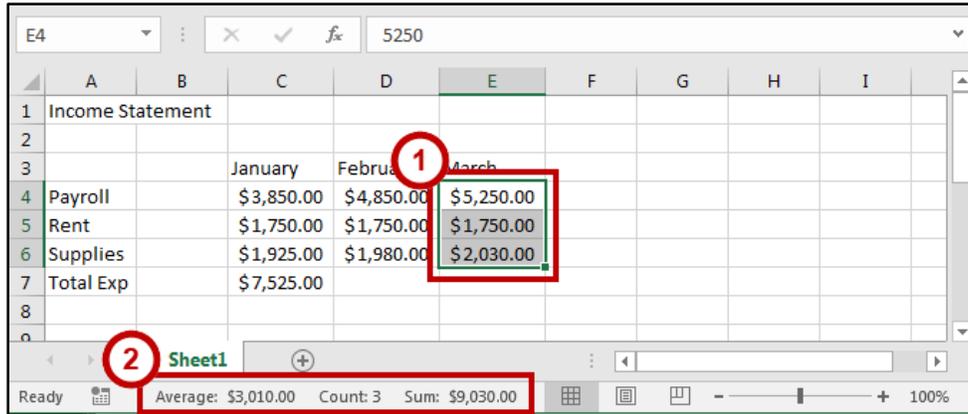


Figure 18 - Auto-Calculate

3. Other calculations can also appear on the status bar. To see the other calculations available, right-click on the **status bar**.
4. A list will appear displaying the calculations you can perform.
5. Select any **calculations** you wish to display on the *Status Bar*.



Figure 19 - Status bar calculations

6. The new calculations will appear in the *auto calculate* area of the status bar.



Figure 20 - Added Auto-Calculate Functions

# AutoSum

The *AutoSum* tool can quickly enter a basic formula for you in a selected cell. The following example will use the *AutoSum* tool to calculate the *Sum*.

1. Select the **cell** where you want the answer to appear.
2. Under the *Home tab*, in the *Editing* grouping, click **AutoSum**.

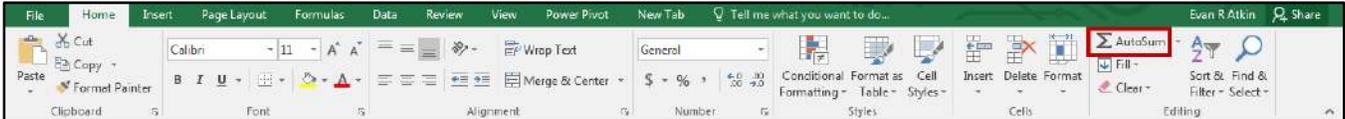


Figure 21 - AutoSum

3. A *selection* box will appear around any numbers directly above your selected cell. Adjust the selection box by dragging the sizing handles to include any additional cells.

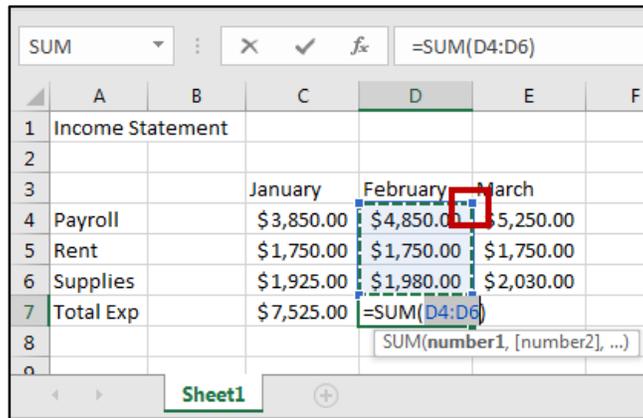


Figure 22 – Selection Box

4. Press the **Enter** key to insert the answer.

**Note:** The *AutoSum* tool can also be used to run basic functions like AVERAGE, COUNT, MIN, and MAX. Click the **drop-down** arrow next to *AutoSum* to make a selection.

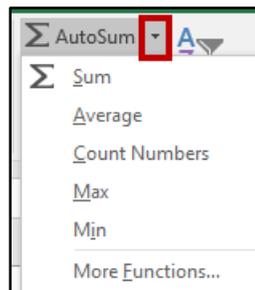


Figure 23 - AutoSum Additional Calculations

## Additional Help

For additional support, please contact the KSU Service Desk:

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