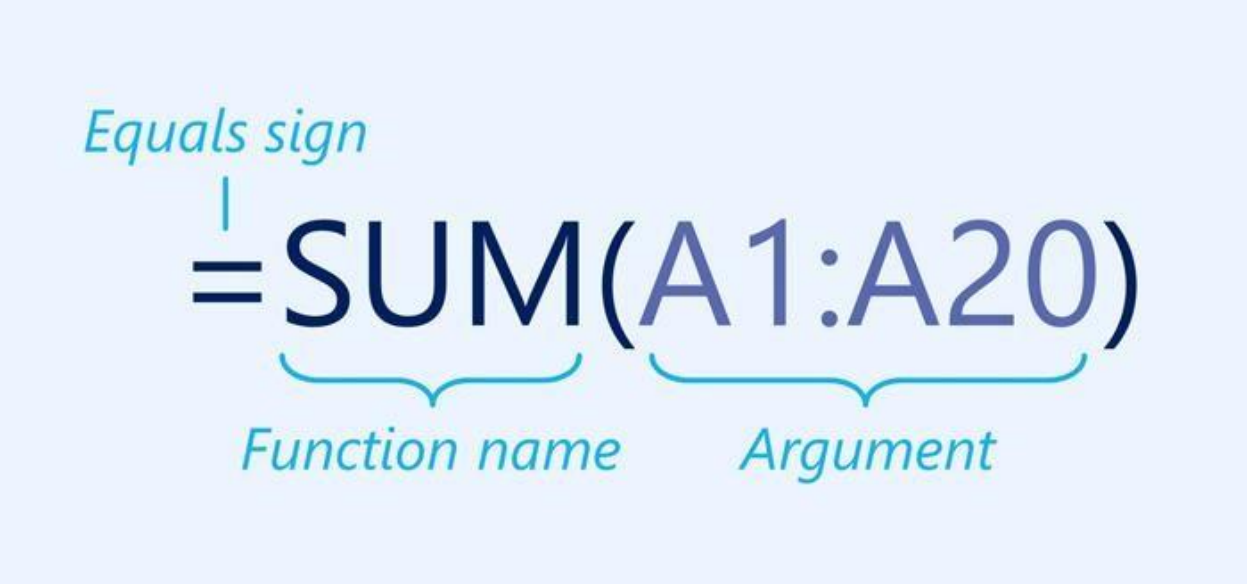
Functions

Introduction

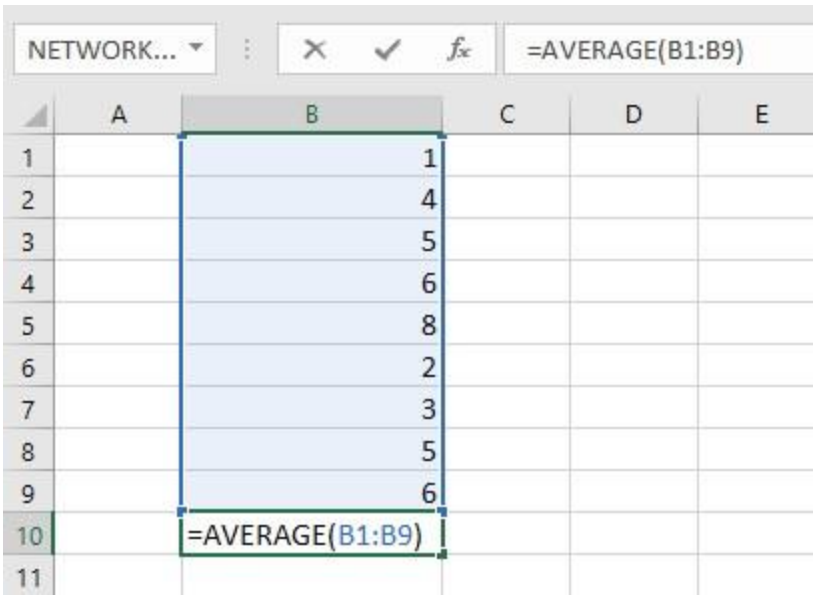
A **function** is a **predefined formula** that performs calculations using specific values in a particular order. Excel includes many common functions that can be used to quickly find the **sum**, **average**, **count**, **maximum value**, and **minimum value** for a range of cells. In order to use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

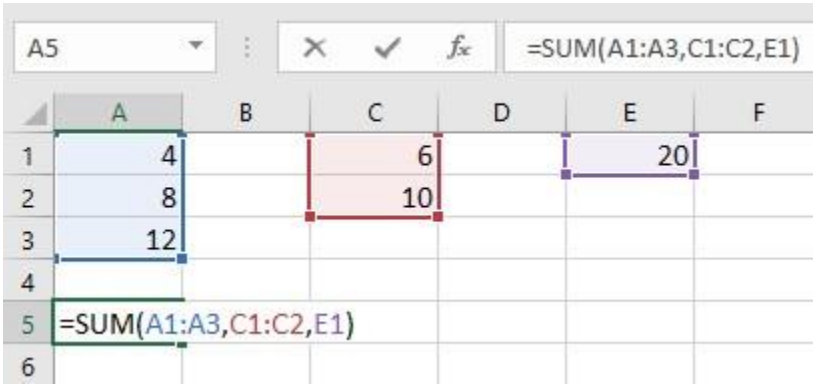
In order to work correctly, a function must be written a specific way, which is called the **syntax**. The basic syntax for a function is the **equals sign (=)**, the **function name** (SUM, for example), and one or more **arguments**. Arguments contain the information you want to calculate. The function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



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.



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.



Creating a function

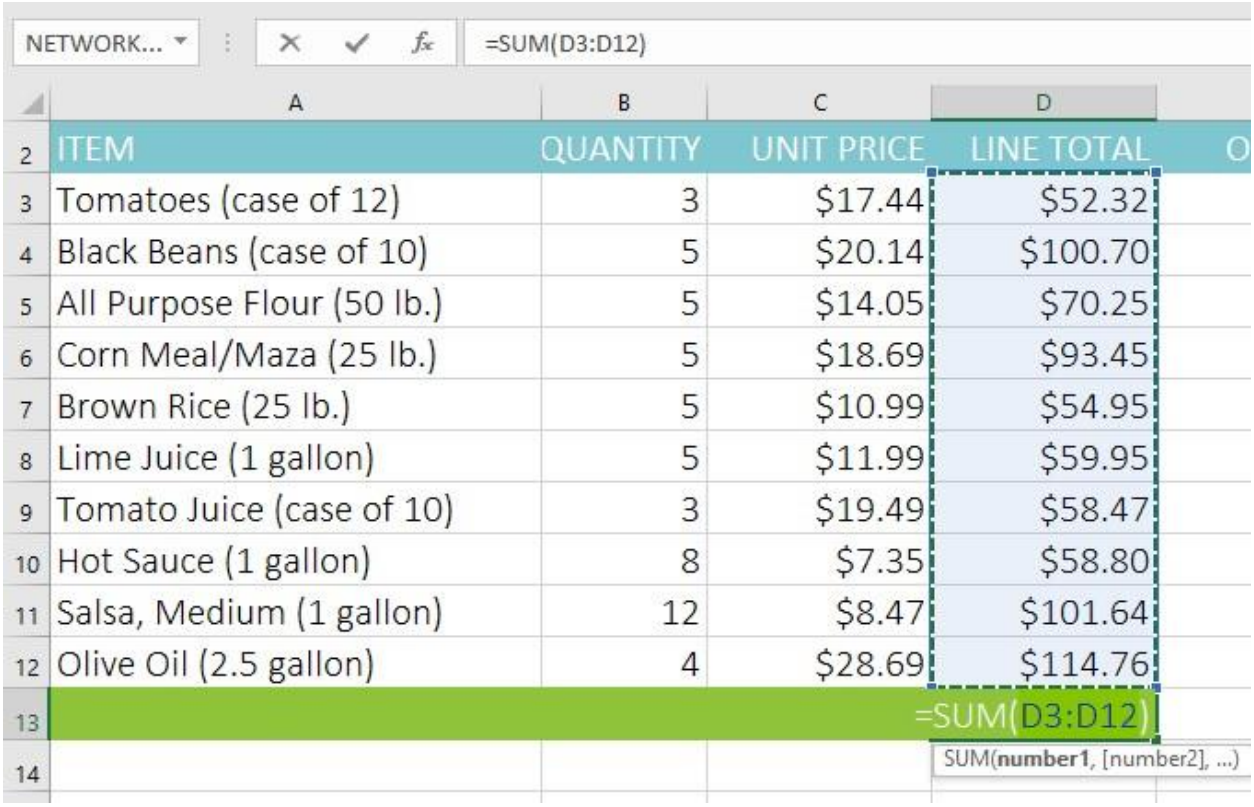
There are a variety of functions available in Excel. Here are some of the most common functions you'll use:

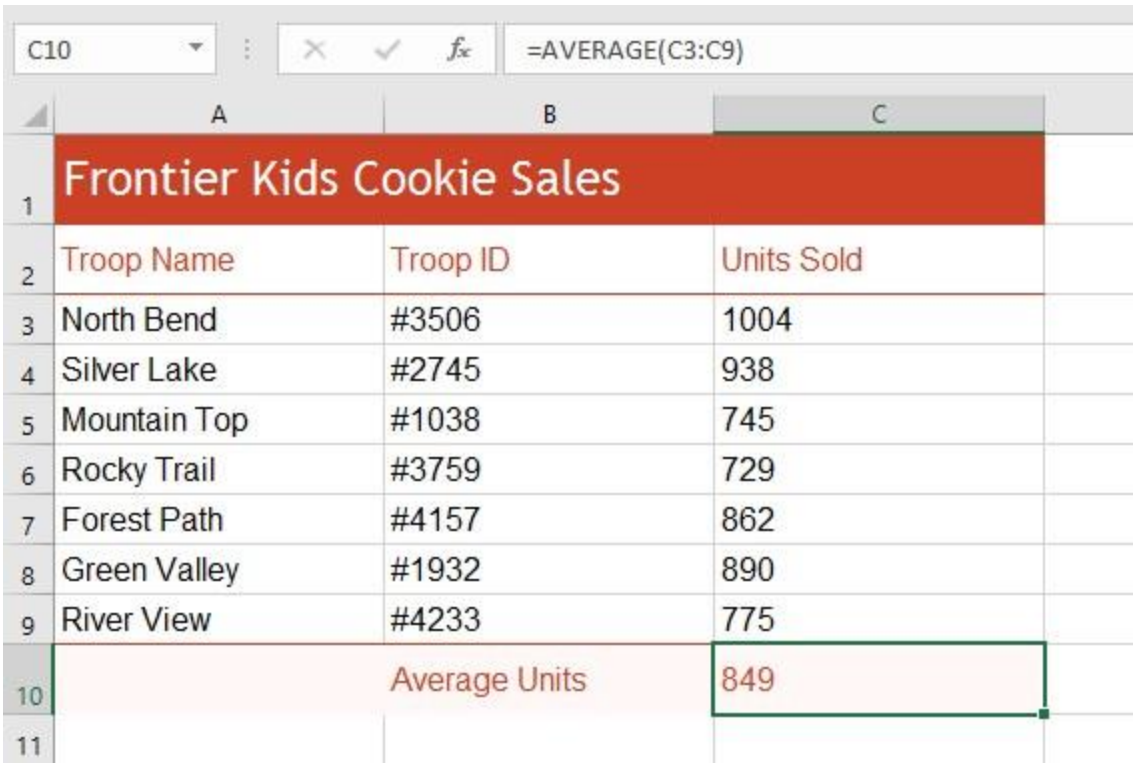
- **SUM**: This function **adds** all of the values of the cells in the argument.
- **AVERAGE**: This function determines the **average** of the values included in the argument. It calculates the sum of the cells and then divides that value by the number of cells in the argument.
- **COUNT**: This function **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 AutoSum command:

- 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.



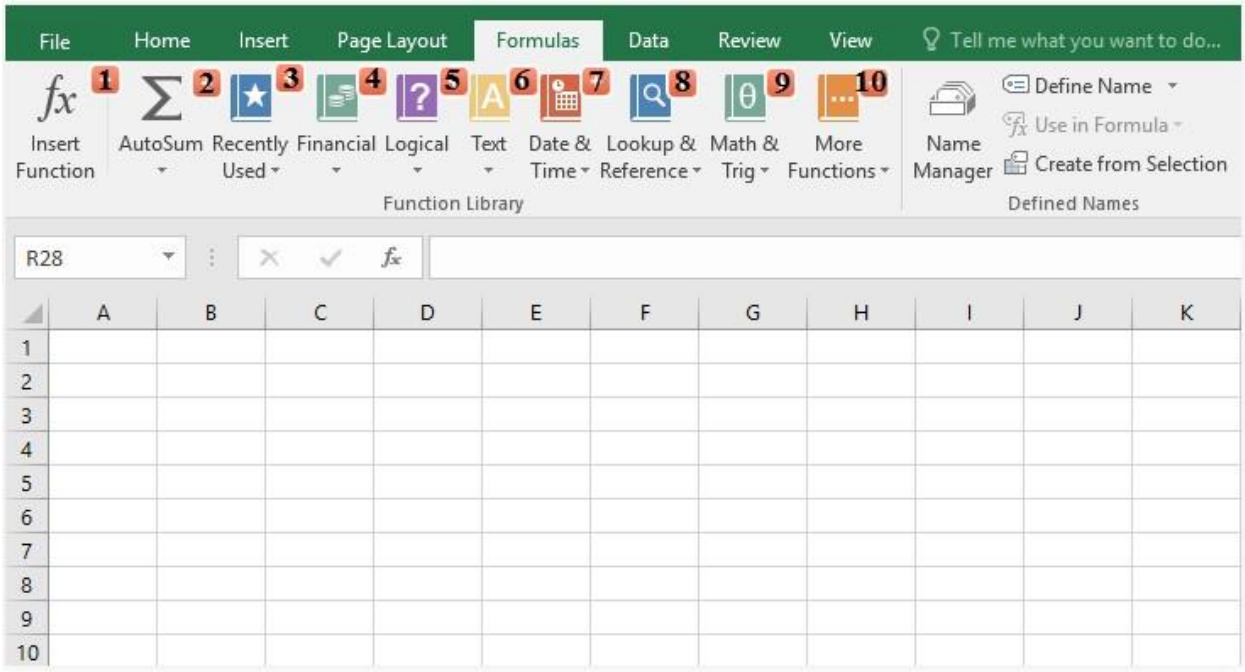


The Function Library

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 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.

Refer to the figure below to learn more about the different types of functions in Excel.



1. ***Insert Function :*** If you're having trouble finding the right function, the **Insert Function** command allows you to search for functions using keywords.

2. ***AutoSum Command :*** The **AutoSum** command allows you to automatically return results for common functions, like **SUM**, **AVERAGE**, and **COUNT**.

3. ***Recently Used :*** The **Recently Used** command gives you access to functions you've recently worked with.

4. ***Financial :*** The **Financial** category contains functions for financial calculations like determining a payment (**PMT**) or interest rate for a loan (**RATE**).

5. ***Logical :*** Functions in the **Logical** category check arguments for a value or condition. For example, if an order is more than $50, add $4.99 for shipping; if it is more than $100, do not charge for shipping (**IF**).

6. ***Text :*** The **Text** category contains functions that work with the text in arguments to perform tasks, such as converting text to lowercase (**LOWER**) or replacing text (**REPLACE**).

7. ***Date & Time :*** The **Date & Time** category contains functions for working with dates and time and will return results like the current date and time (**NOW**) or the seconds (**SECOND**).

8. ***Lookup & Reference :*** The **Lookup & Reference** category contains functions that will return results for finding and referencing information. For example, you can add a hyperlink to a cell (**HYPERLINK**) or return the value of a particular row and column intersection (**INDEX**).

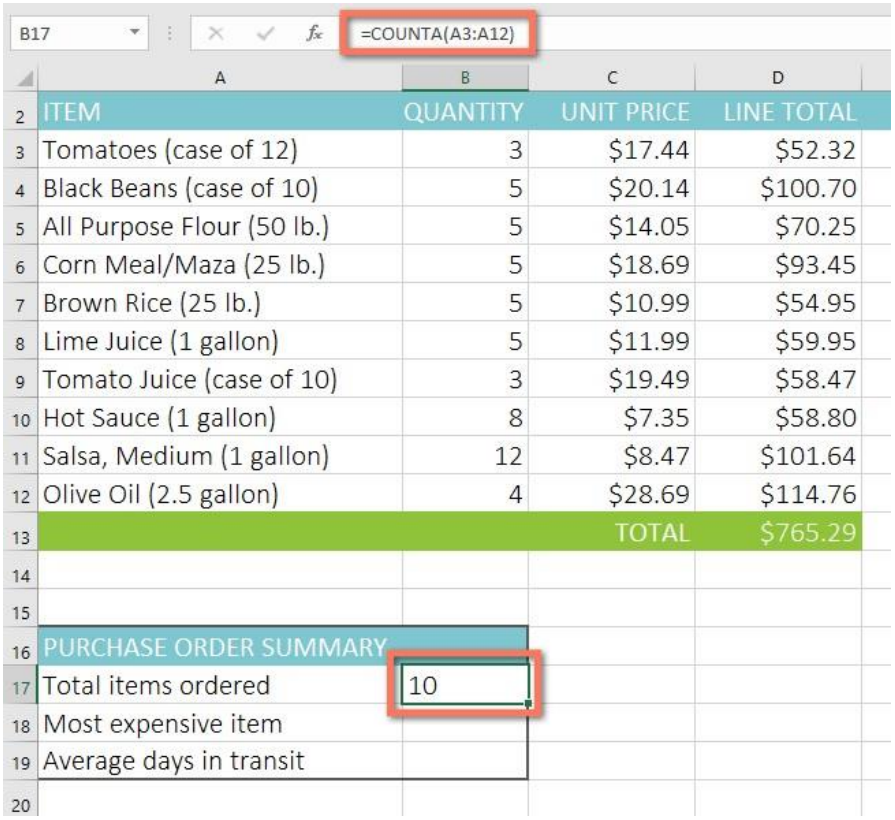
9. ***Math & Trig :*** The **Math & Trig** category includes functions for numerical arguments. For example, you can round values (**ROUND**), find the value of Pi (**PI**), multiply (**PRODUCT**), and subtotal (**SUBTOTAL**).

10. ***More Functions :*** **More Functions** contains additional functions under categories for **Statistical**, **Engineering**, **Cube**, **Information**, and **Compatibility**.

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**.

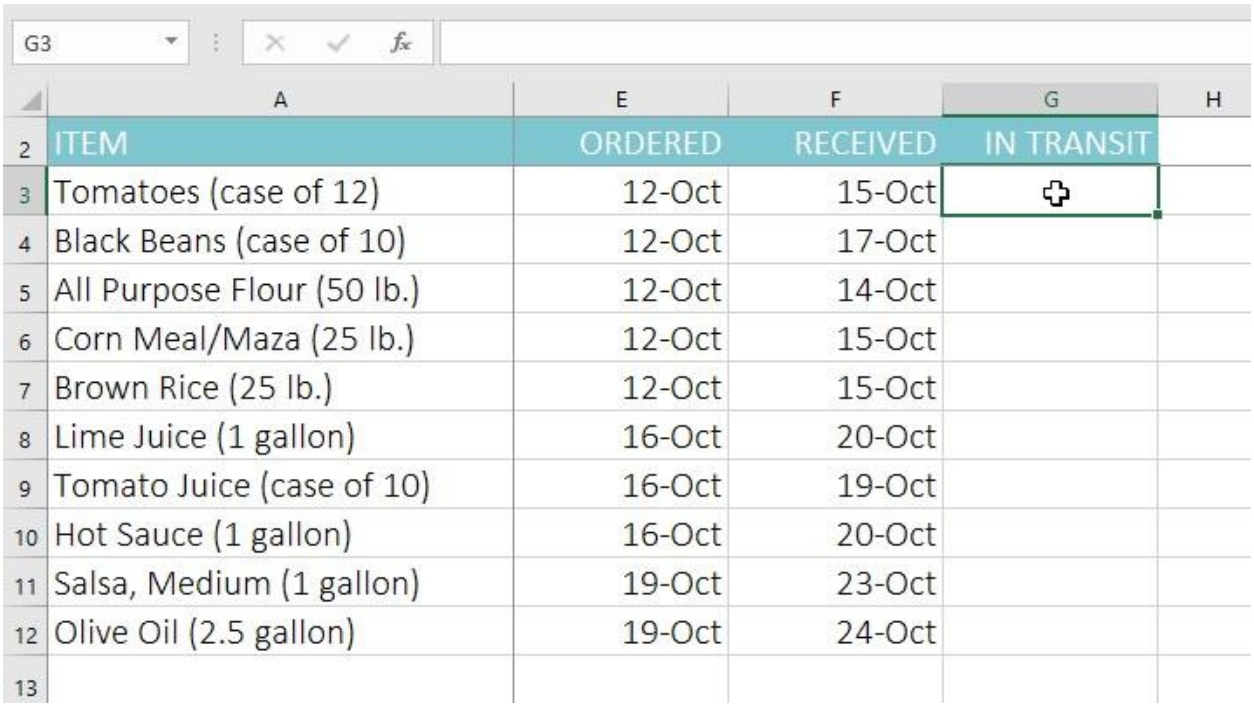


	A	B	C	D
2	ITEM	QUANTITY	UNIT PRICE	LINE TOTAL
3	Tomatoes (case of 12)	3	$17.44	$52.32
4	Black Beans (case of 10)	5	$20.14	$100.70
5	All Purpose Flour (50 lb.)	5	$14.05	$70.25
6	Corn Meal/Maza (25 lb.)	5	$18.69	$93.45
7	Brown Rice (25 lb.)	5	$10.99	$54.95
8	Lime Juice (1 gallon)	5	$11.99	$59.95
9	Tomato 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	10		
18	Most expensive item			
19	Average days in transit			
20				

To use the Insert Function command:

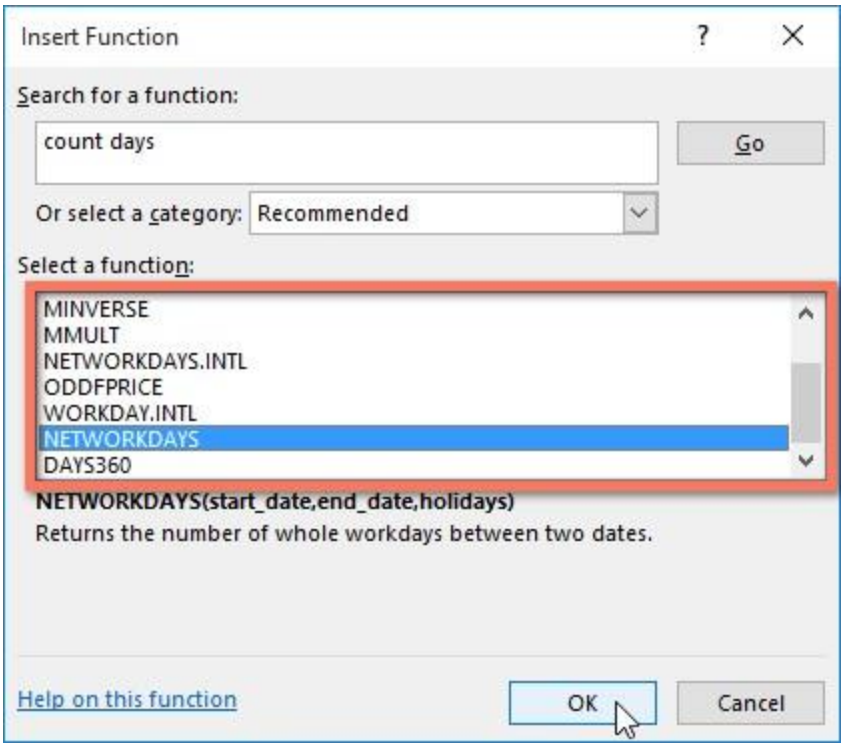
In the example below, we want to find a function that will calculate the **number of business days** it took to receive items after they were ordered. We'll use the dates in columns **E** and **F** to calculate the delivery time in column **G**.

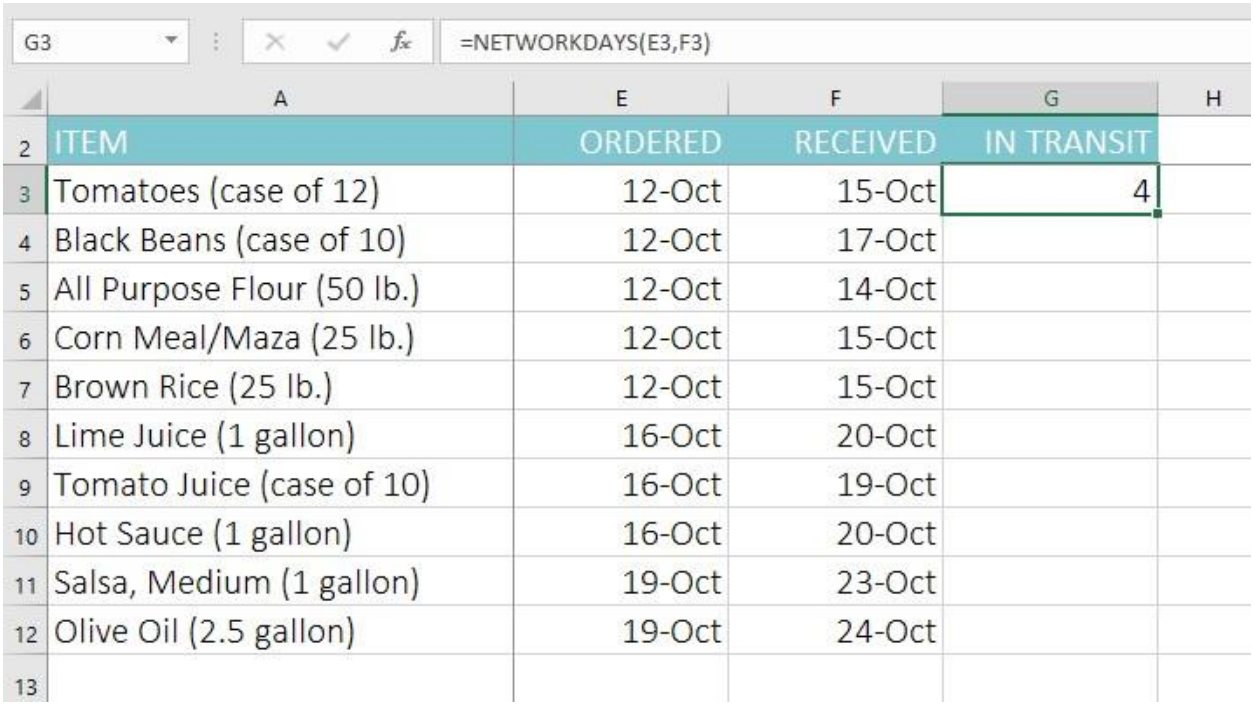
1. Select the **cell** that will contain the function. In our example, we'll select cell **G3**.



	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.
3. The **Insert Function** dialog box will appear.
4. Review the **results** to find the desired function, then click **OK**. In our example, we'll choose **NETWORKDAYS**, which will count the number of business days between the ordered date and received date.





	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					

Tables

Introduction

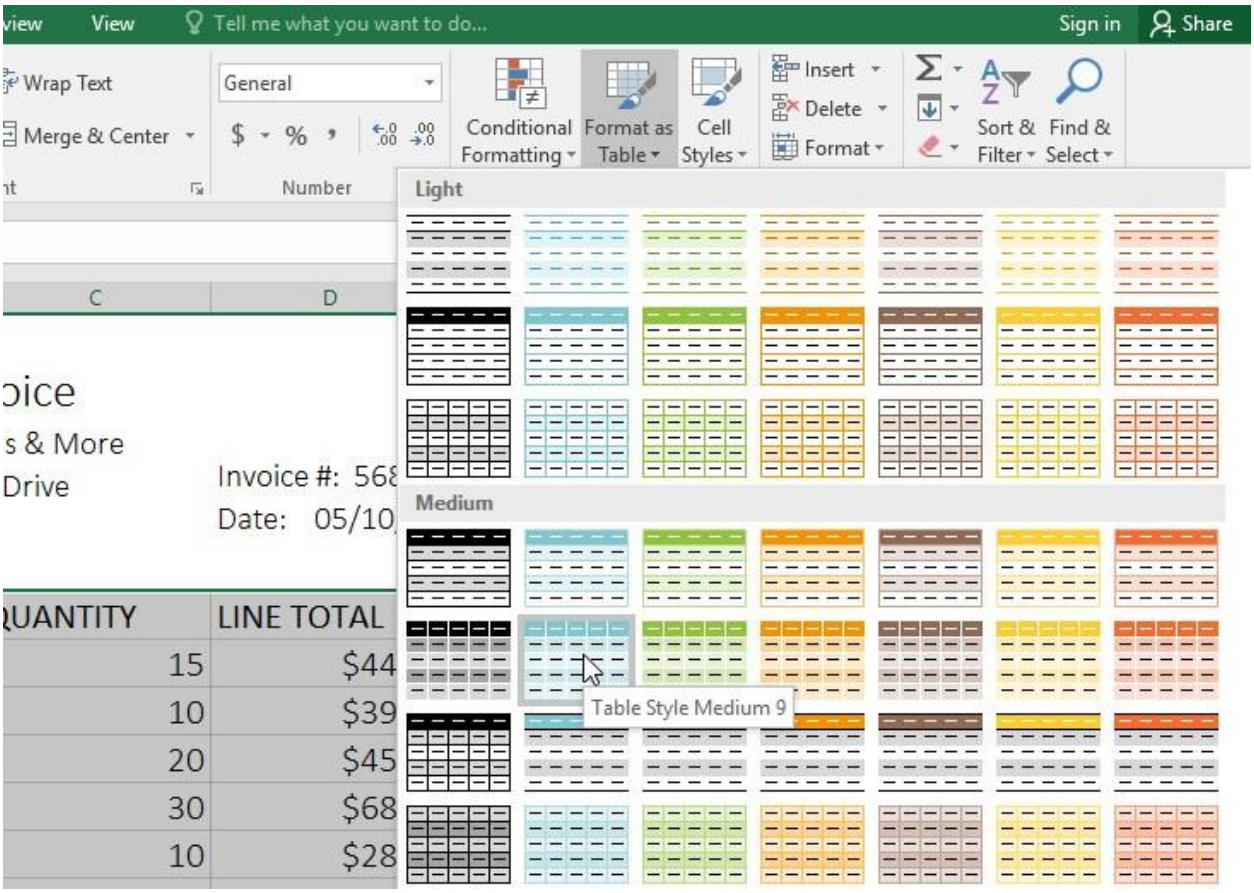
Once you've entered information into your worksheet, you may want to format your data as a **table**. Just like regular formatting, tables can improve the **look and feel** of your workbook, and they'll also help you **organize** your content and make your data easier to use. Excel includes several **tools** and **predefined table styles**, allowing you to create tables quickly and easily.

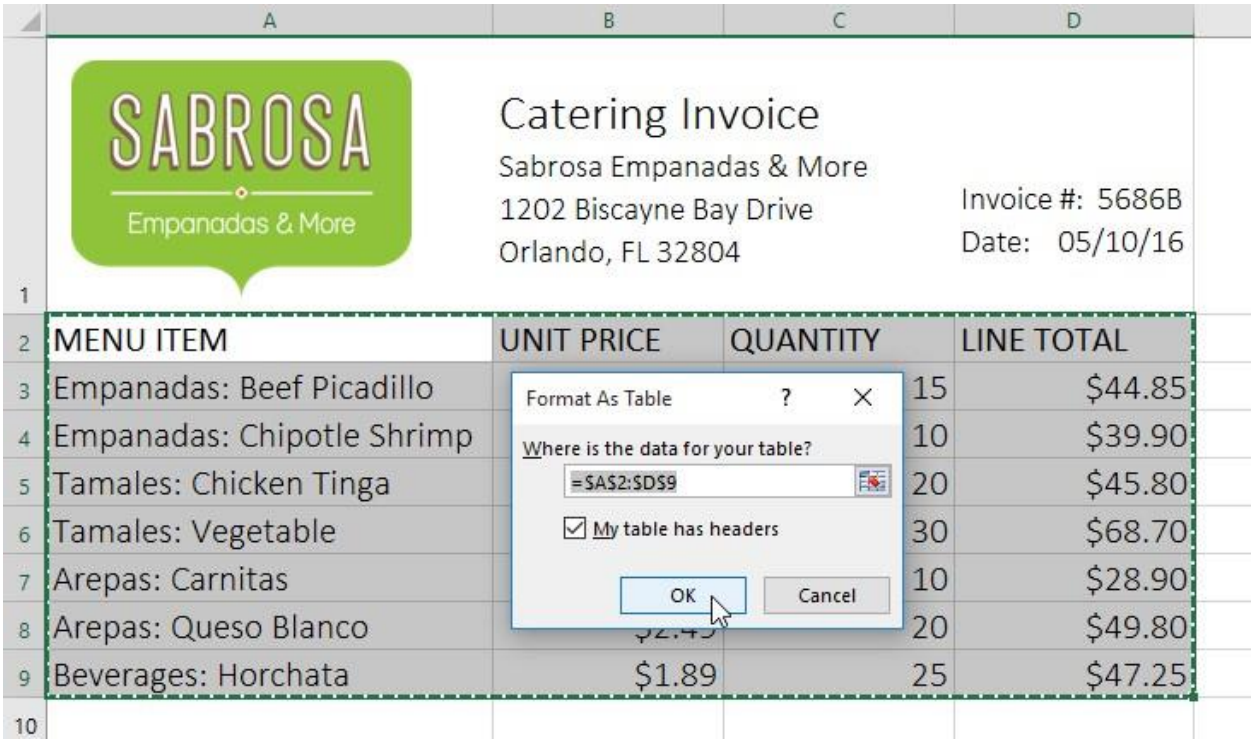
To format data as a table:

1. Select the **cells** you want to format as a table. In our example, we'll select the cell range **A2:D9**.

MENU ITEM	UNIT PRICE	QUANTITY	LINE TOTAL
Empanadas: Beef Picadillo	$2.99	15	$44.85
Empanadas: Chipotle Shrimp	$3.99	10	$39.90
Tamales: Chicken Tinga	$2.29	20	$45.80
Tamales: Vegetable	$2.29	30	$68.70
Arepas: Carnitas	$2.89	10	$28.90
Arepas: Queso Blanco	$2.49	20	$49.80
Beverages: Horchata	$1.89	25	$47.25

2. From the **Home** tab, click the **Format as Table** command in the **Styles** group.


View
Tell me what you want to do...
Sign in
Share
Wrap Text
Merge & Center
General
Number
Conditional Formatting
Format as Table
Cell Styles
Insert
Delete
Format
Sort & Filter
Find & Select
Light
Medium
Table Style Medium 9
C
D
Invoice #: 568
Date: 05/10
QUANTITY
LINE TOTAL
15
$44
10
$39
20
$45
30
$68
10
$28


SABROSA
Empanadas & More
Catering Invoice
Sabrosa Empanadas & More
1202 Biscayne Bay Drive
Orlando, FL 32804
Invoice #: 5686B
Date: 05/10/16
MENU ITEM
UNIT PRICE
QUANTITY
LINE TOTAL
Empanadas: Beef Picadillo
15
$44.85
Empanadas: Chipotle Shrimp
10
$39.90
Tamales: Chicken Tinga
20
$45.80
Tamales: Vegetable
30
$68.70
Arepas: Carnitas
10
$28.90
Arepas: Queso Blanco
20
$49.80
Beverages: Horchata
$1.89
25
$47.25
Format As Table
Where is the data for your table?
=$A$2:$D$9
My table has headers
OK
Cancel

SABROSA
Empanadas & More

Catering Invoice

Sabrosa Empanadas & More
1202 Biscayne Bay Drive
Orlando, FL 32804

Invoice #: 5686B
Date: 05/10/16

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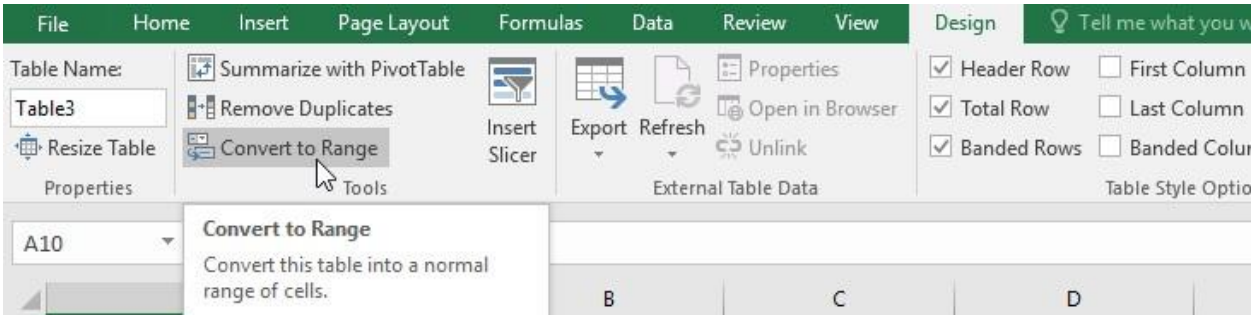
Arepas: Queso Blanco	$2.49	20	$49.80
Beverages: Horchata	$1.89	25	$47.25

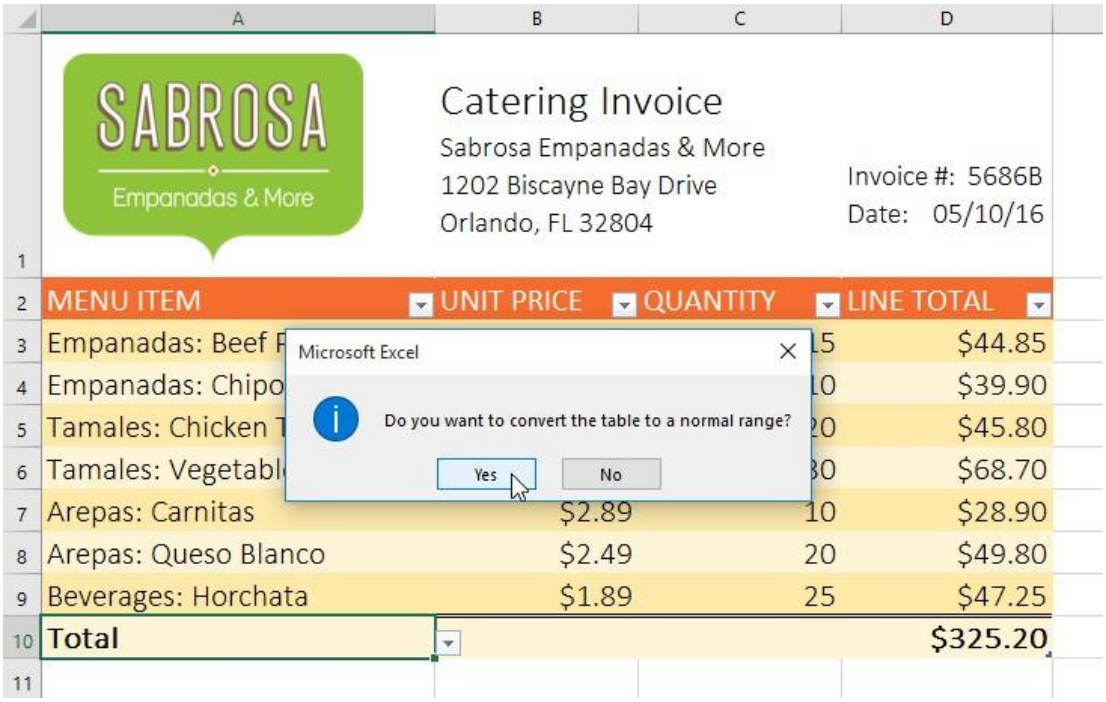
To remove a table:

It's possible to remove a table from your workbook without losing any of your data. However, this can cause issues with certain types of **formatting**, including colors, fonts, and banded rows. Before you use this option, make sure you're prepared to reformat your cells if necessary.

1. Select **any cell** in your table, then click the **Design** tab.

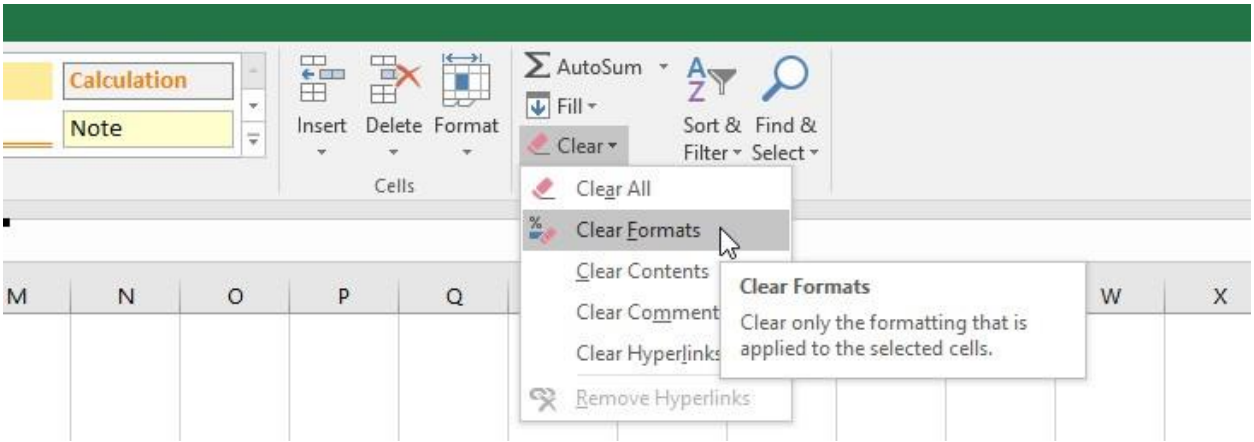
2. Click the **Convert to Range** command in the **Tools** group.





3. The range will no longer be a table, but the cells will retain their data and formatting.

4. To restart your formatting from scratch, click the **Clear** command on the **Home** tab. Next, choose **Clear Formats** from the menu.



Charts

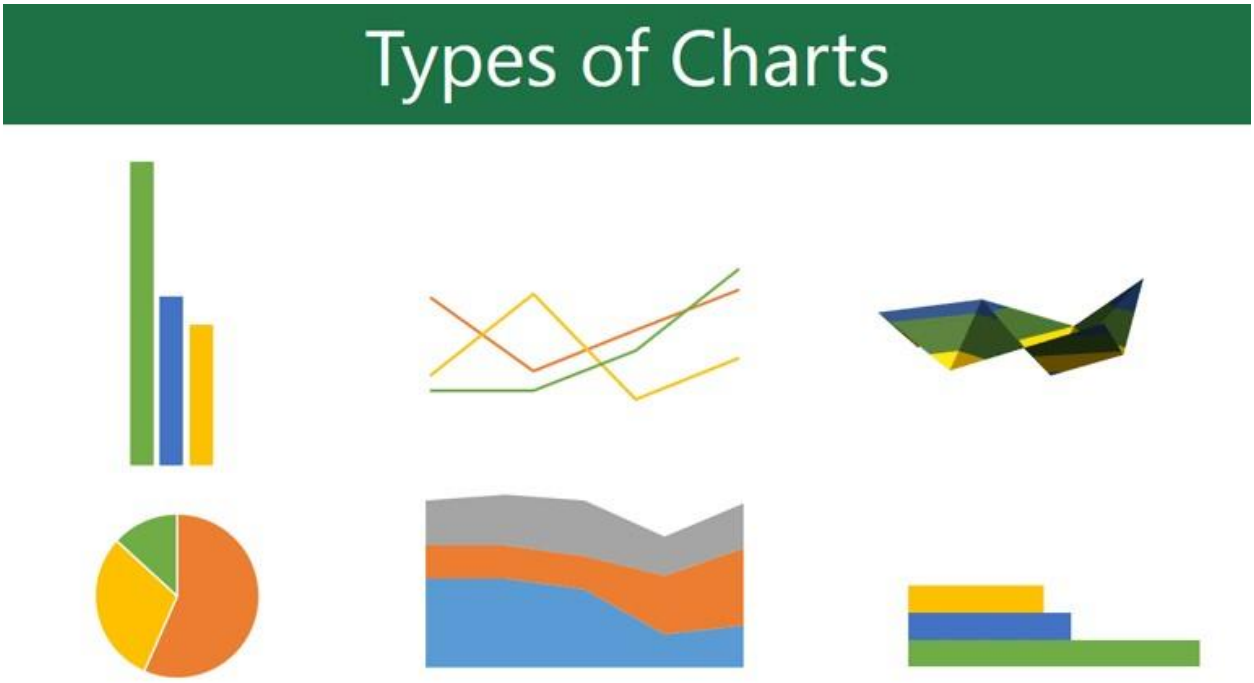
Introduction

It can be difficult to interpret Excel workbooks that contain a lot of data. **Charts** allow you to illustrate your workbook data **graphically**, which makes it easy to visualize **comparisons** and **trends**.

Understanding charts

Excel has several different **types of charts**, allowing you to choose the one that best fits your data. In order to use charts effectively, you'll need to understand how different charts are used.

Refer to the figure below to learn more about the types of charts in Excel.



1. ***Vertical Axis :*** The **vertical axis** (also known as the **y axis**) is the vertical part of the chart. Here, the vertical axis measures the **value** of the columns. In this example, the measured value is each genre's total sales.
2. ***Chart Title :*** The title should clearly describe what the chart is illustrating.

3. ***Data Series :*** The **data series** consists of the related data points in a chart. In this example, as we can see in the legend, the yellow columns represent net sales in February.

4. ***Horizontal Axis :*** The **horizontal axis** (also known as the **x axis**) is the horizontal part of the chart.

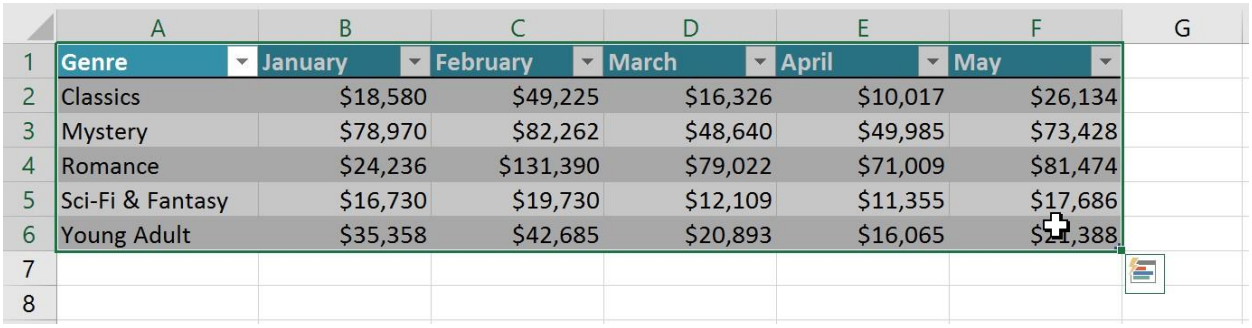
Here, the horizontal axis identifies the **categories** in the chart. In this example, each genre is placed in its own **group**.

5. ***Legend :*** The **legend** identifies which data series each **color** on the chart represents.

In this example, the legend identifies the different months in the chart.

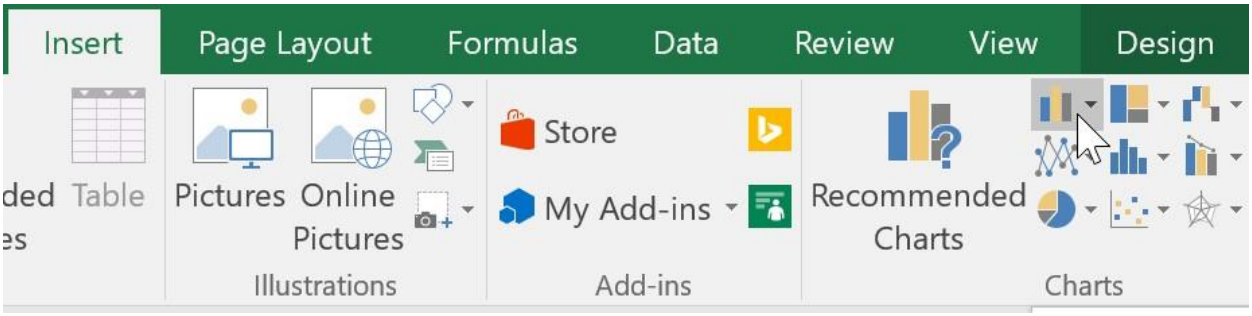
To insert a chart:

1. Select the **cells** you want to chart, including the **column titles** and **row labels**. These cells will be the source data for the chart. In our example, we'll select cells A1:F6.

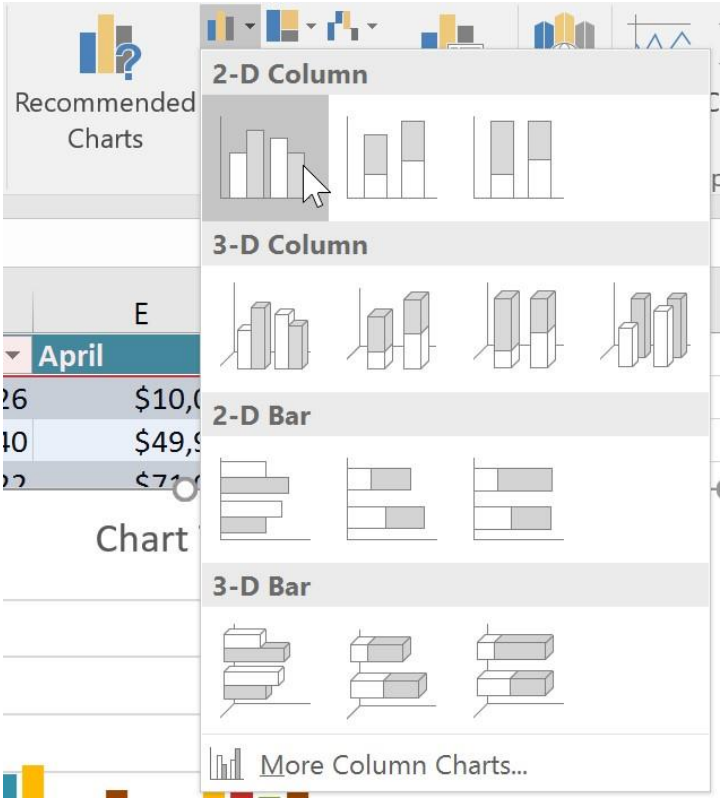


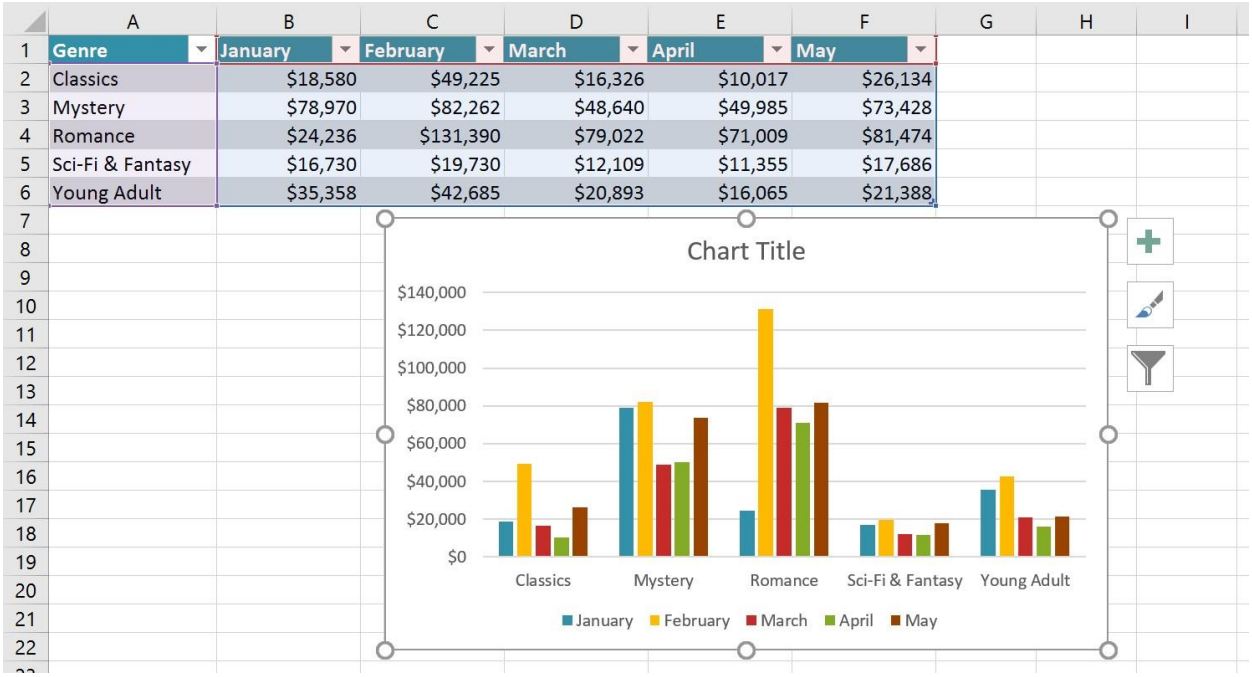
	A	B	C	D	E	F	G
1	Genre	January	February	March	April	May	
2	Classics	$18,580	$49,225	$16,326	$10,017	$26,134	
3	Mystery	$78,970	$82,262	$48,640	$49,985	$73,428	
4	Romance	$24,236	$131,390	$79,022	$71,009	$81,474	
5	Sci-Fi & Fantasy	$16,730	$19,730	$12,109	$11,355	$17,686	
6	Young Adult	$35,358	$42,685	$20,893	$16,065	$21,388	
7							
8							

2. From the **Insert** tab, click the desired **Chart** command. In our example, we'll select **Column**.



Choose the desired **chart type** from the drop-down menu.





Genre	January	February	March	April	May
Classics	$18,580	$49,225	$16,326	$10,017	$26,134
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