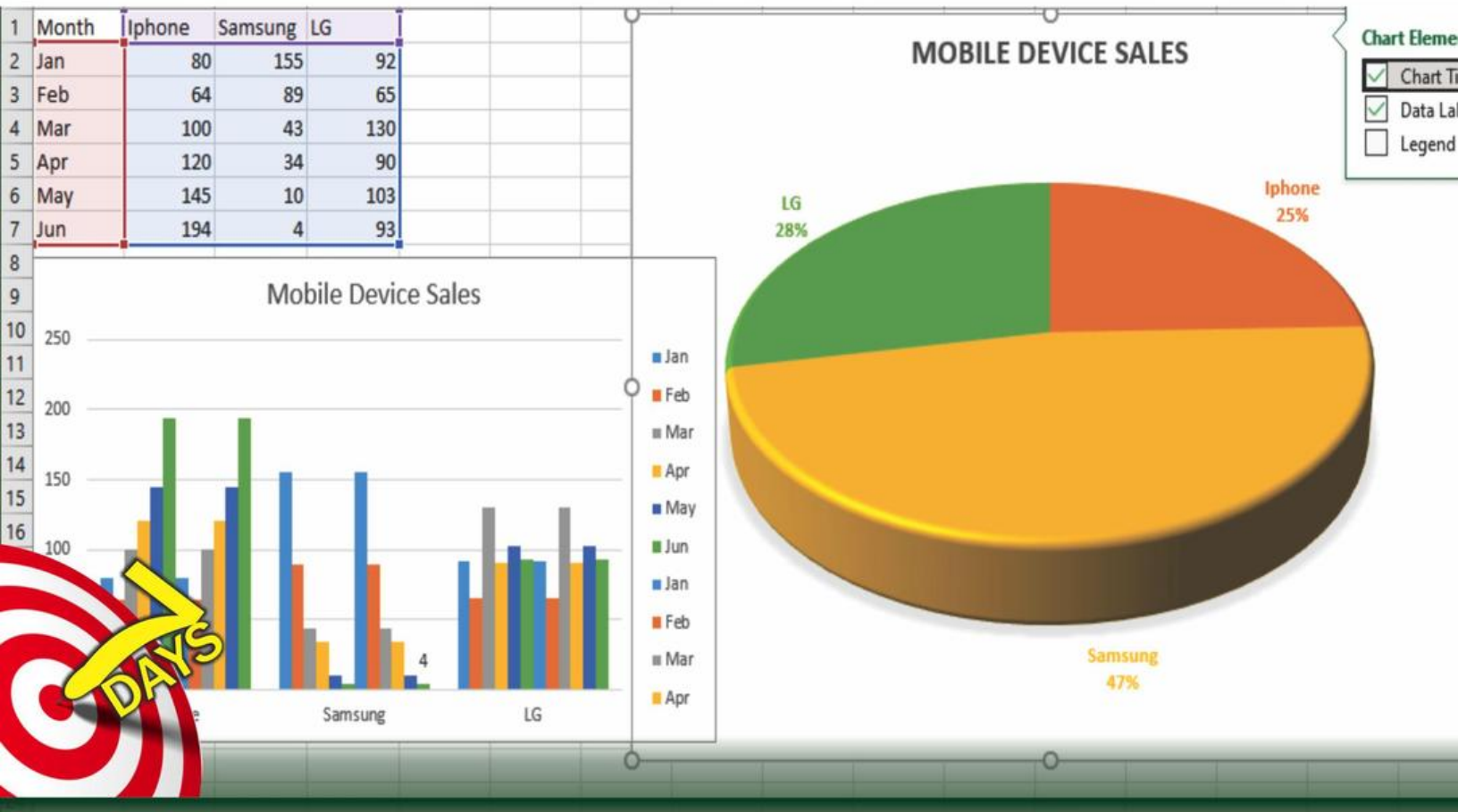
EXCEL 2023

An Illustrated Step-by-Step Guide for Beginners



KYLE MCANTHONY

EXCEL 2023

AN ILLUSTRATED STEP-BY-STEP GUIDE FOR BEGINNERS

Kyle McAnthony

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LESSON 1

INTRODUCTION

Excel stands out among its counterparts regarding data storage, manipulation, and analysis. It is a versatile tool that can be utilized for various aspects of business management, such as budgeting, accounting, inventory tracking, and trend analysis.

Think of Excel as a digital notebook where you can create tables, charts, and graphs to visualize your data and make informed decisions. With its user-friendly interface and versatile features, Excel is essential for anyone looking to streamline their data management process.

My experience has shown me that the most effective way to learn something new is to dive right in with both feet and start working with it immediately. In this beginner's guide, I will take you through the basics of Excel, from setting up your first spreadsheet to performing complex calculations and data analysis. I will use metaphors and analogies to help you understand the concepts and share real-world examples to illustrate their practical applications.

So let's start on your journey to mastering Excel and unlocking the full potential of your data! Remember that the speed with which you can apply the knowledge from this guide will go a long way to determining how beneficial this experience is for you.

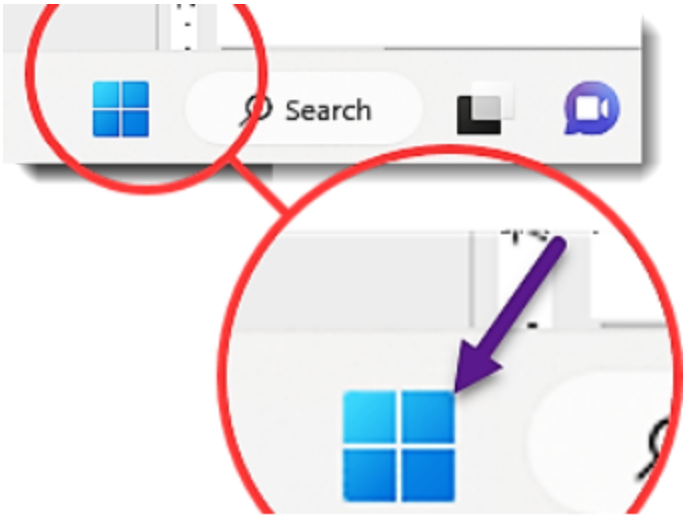
LAUNCHING THE EXCEL APPLICATION

This guide includes relevant instructions and illustrations for Excel versions 2003 and newer, including 2016 and beyond. Although you may encounter some variances, such as the Excel startup interface, these differences are not significant. Therefore, you can proceed with confidence and utilize this guide with your own version of Excel.

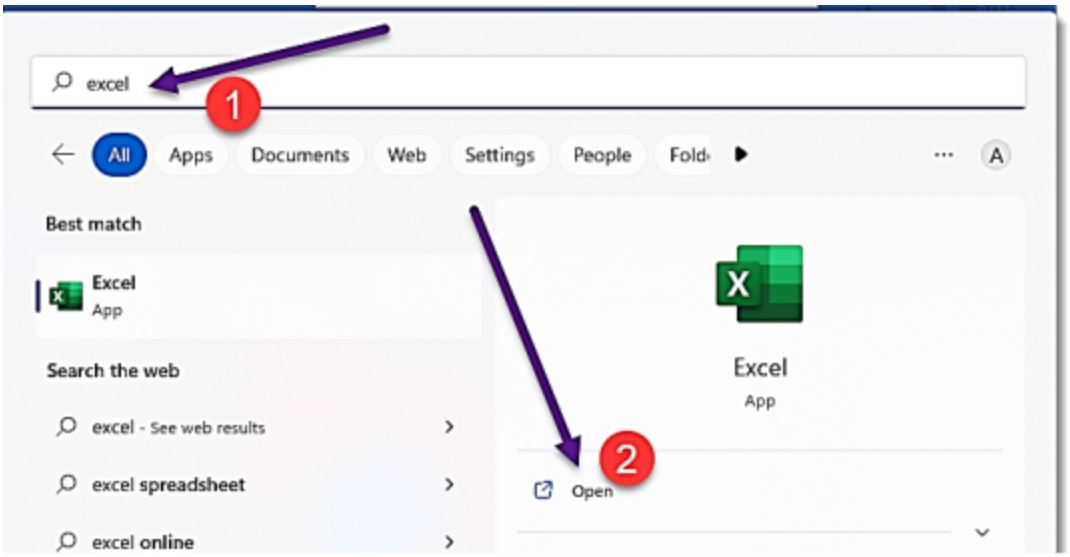
To begin using Microsoft Excel, the first thing you will need is to launch the application. You may have already done this several times. Here are a few different ways to get Microsoft Excel up and running on your computer.

Using the Start button or Taskbar method

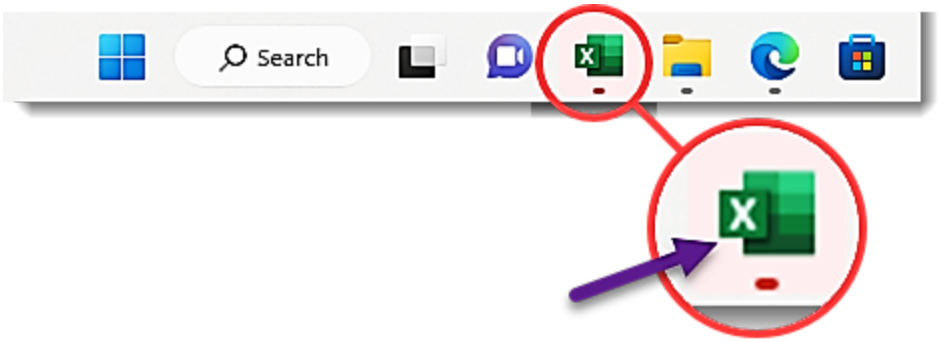
If you are on Windows, click the **Start** button.



Next, start typing the word '**Excel**' with your keyboard to search for the application.



If you have the Excel icon pinned on your taskbar, that will only requires a single click on the icon.

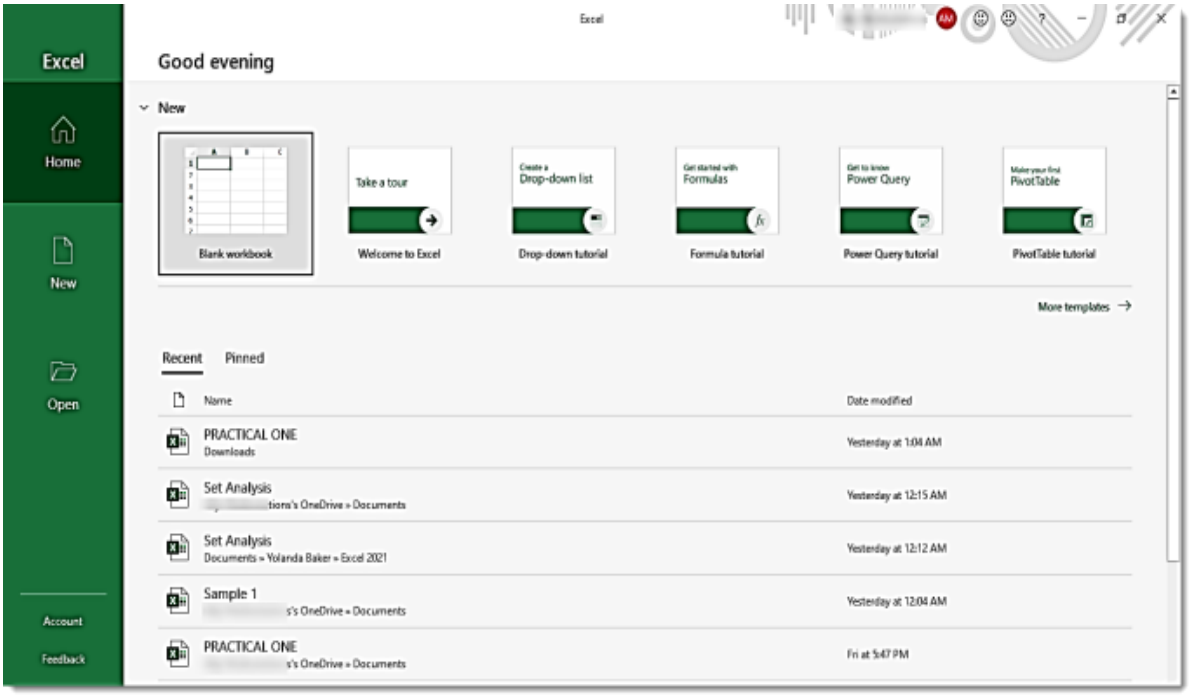


Next, you wait for the Excel application to lunch the version of Excel installed on your computer


Microsoft
Excel
Office 365
Starting...

THE EXCEL START SCREEN

When you open a current version of Microsoft Excel for the first time, the first screen is called the Start screen or the first page of the application.

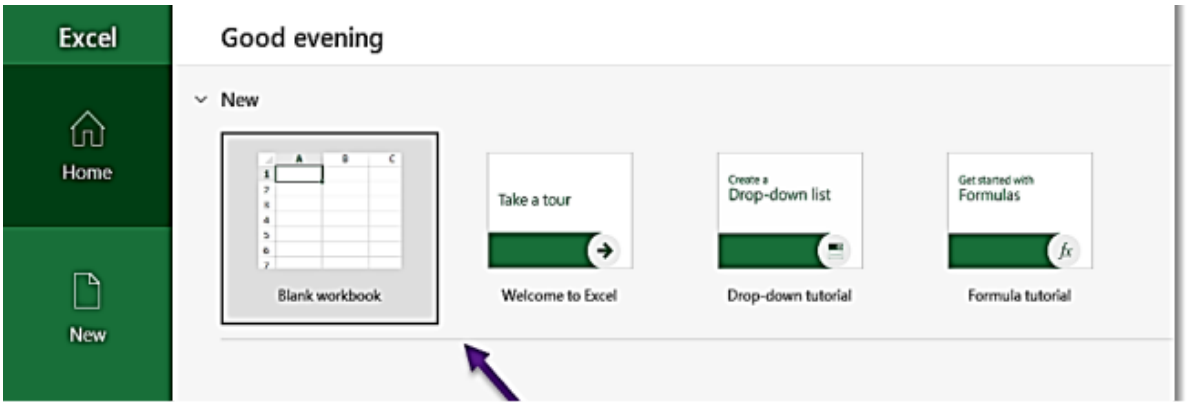


The Excel Start Screen has two panels, one on the left and the other on the right of your screen.

On the left corner is the green color panel, which contains some large icons, including; Home, New Open, and some little links at the bottom.

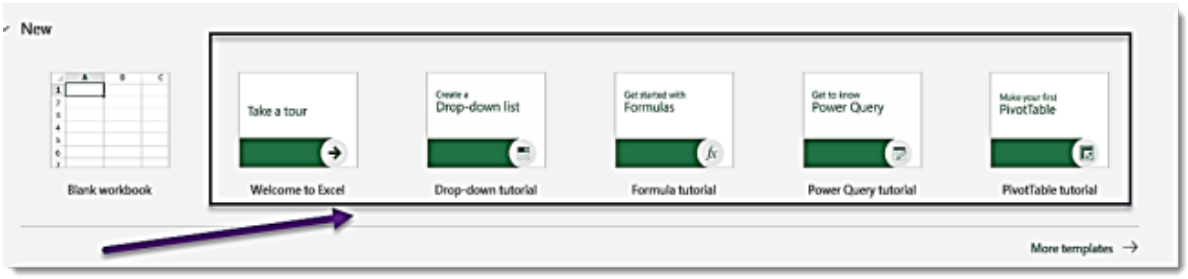


At the top of the right panel, you will find the “Blank Workbook” button.



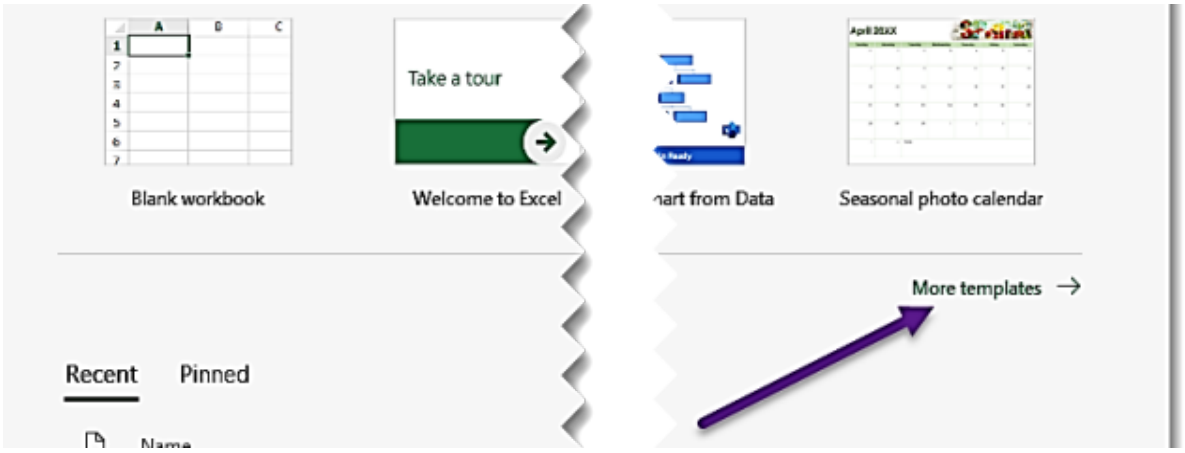
You can open a new blank standard Excel workbook by clicking the "**Blank workbook**" button.

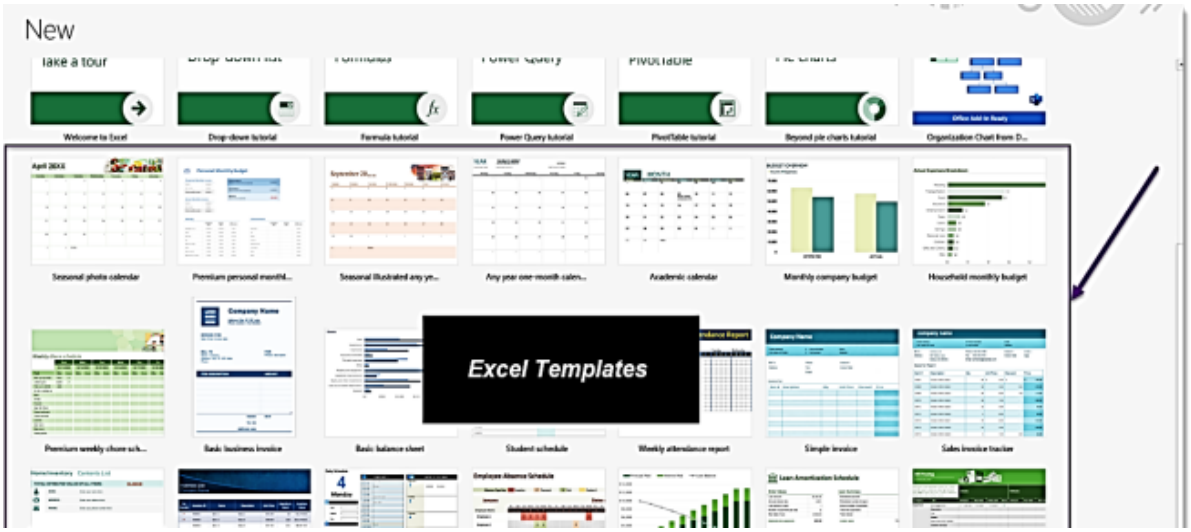
In the right panel of the Excel Start Screen, after the Blank workbook button, there are buttons you can use to navigate through the new functionality introduced in Excel.



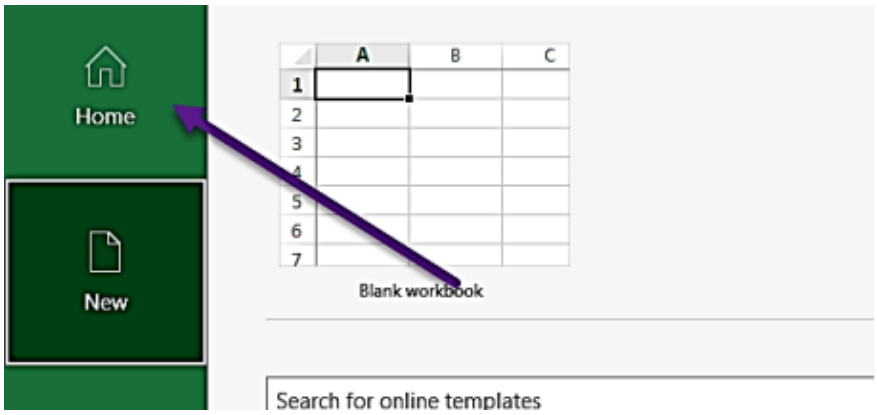
This includes tutorials to get started with formulas, power query, PivotTable, pie charts, and calendar.

There is also the **More templates** link you can click on, to display a list of excel templates available on the Excel Start Screen Right panel.

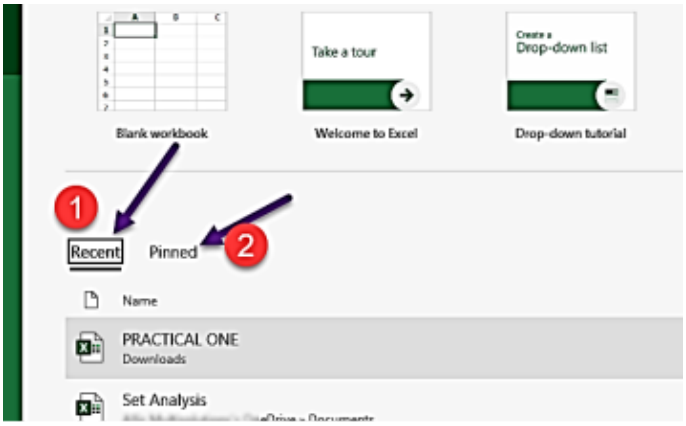




Click on the **Home** button to return to the standard start screen while viewing the templates.



On the right panel below the Blank workboot button, you have two links to either view the **Recently** opened excel file or **Pinned** files.



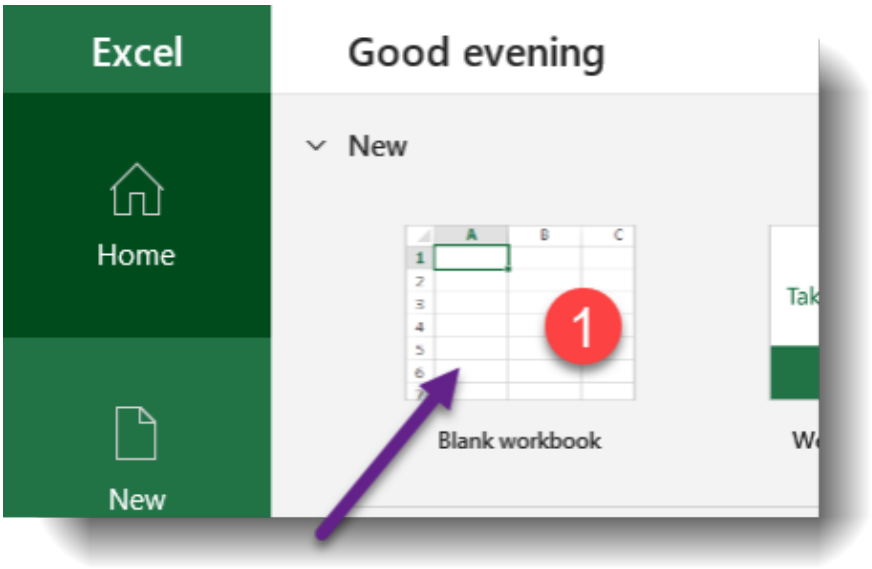
You can pin an Excel file on the start screen to allow you quickly find them later

THE EXCEL INTERFACE

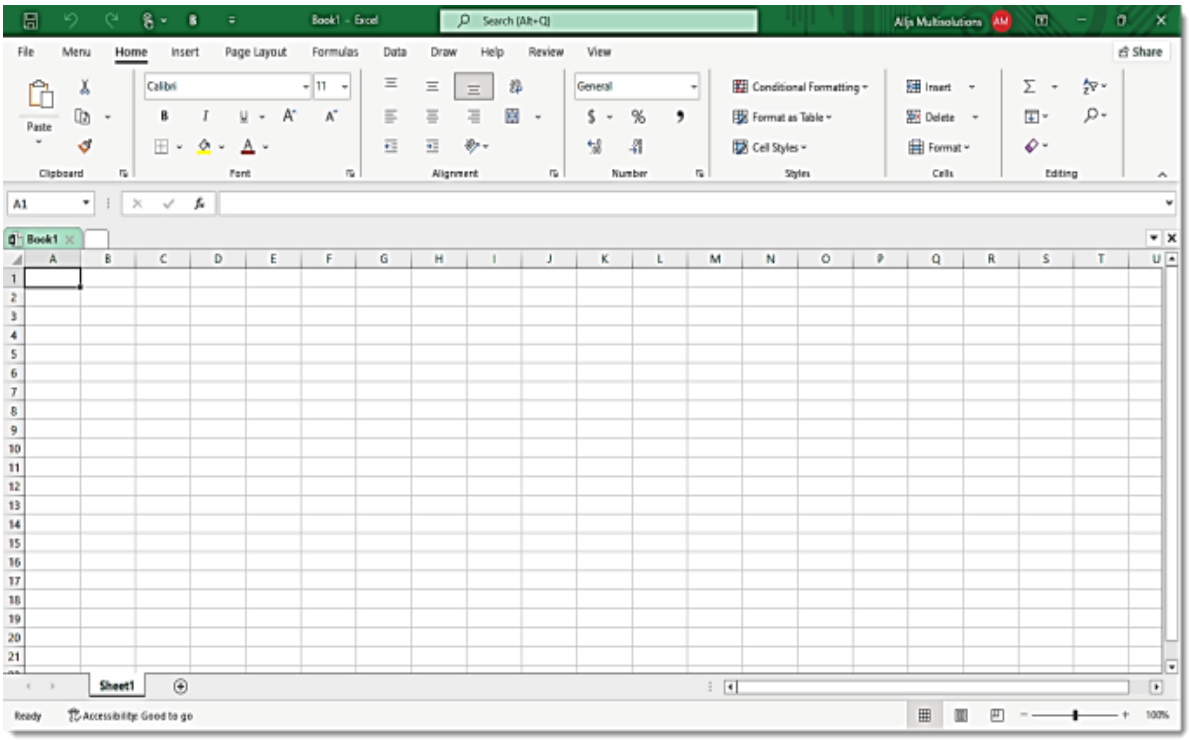
With Excel already running on your computer, you then need to create a **Workbook.**

A Workbook is an Excel file with contaning one or more worksheets for data organization.

Click the **Blank workbook** button on the Excel start screen to create your first new workbook.



Immediately, a new blank workbook will appear on your screen.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Search (Alt+Q)
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File
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Home
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Data
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Help
Review
View
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Clipboard
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11
Font
Alignment
General
Number
Conditional Formatting
Format as Table
Cell Styles
Styles
Insert
Delete
Format
Cells
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A1
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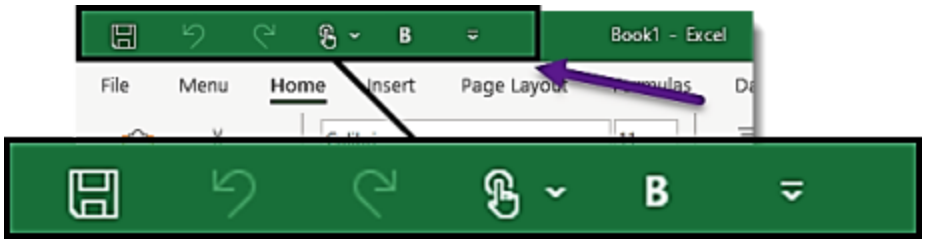
Ready
Accessibility: Good to go
100%

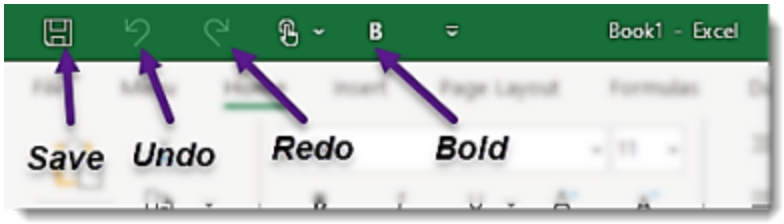
QUICK ACCESS TOOLBAR

You have the Quick Access Toolbar located in the top left corner of the Excel interface.



The quick access toolbar houses your mainly used shortcut commands to enable you quickly access them to boost your productivity.

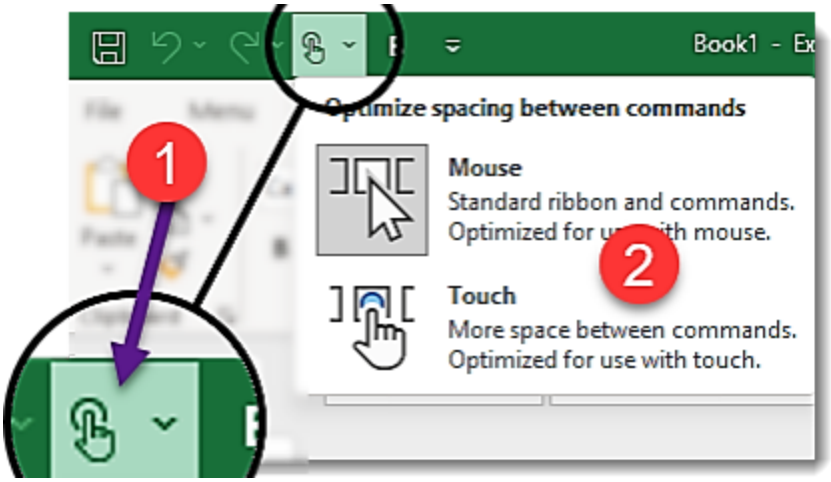
By default, you have a few buttons, including the save, redo, undo, and Bold buttons already added to the quick access toolbar.



You still have the option to add more buttons on the Quick Access toolbar.

MOUSE OR TOUCHSCREEN MODE

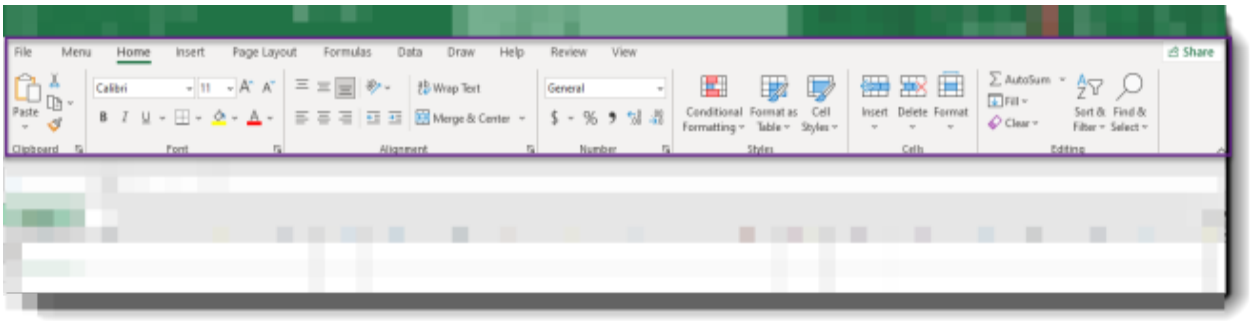
If your device comes with a touch screen, you can choose either a mouse or touchscreen mode for better space management and navigation. To switch from mouse mode to touchscreen mode, click on the mode icon on the Quick Access toolbar.



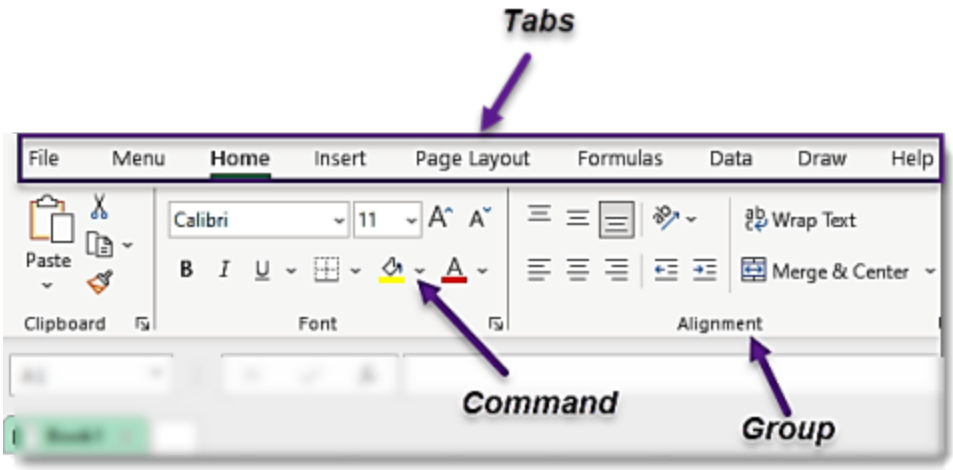
Touchscreen mode creates more space between the items on the excel ribbon, making your command icons appear bigger to improve your screen touch experience.

EXCEL RIBBON

Just below the quick access toolbar, you have the **Excel ribbon**. It runs along the Excel interface from left to right of your screen.



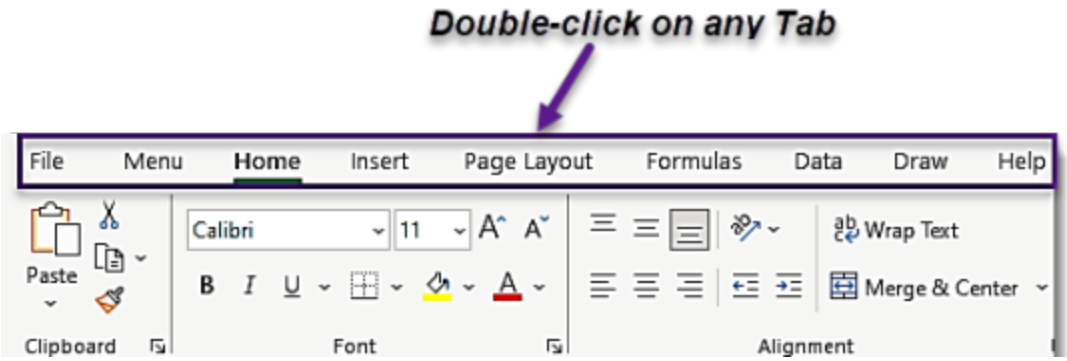
The Excel ribbon has similar characterristics found in other office suit applications, such as the ribbon, tabs, groups, and commands.



Each tab has its own groups and commands, and when you click on one, the ribbon toggles to display specific groups and associated commands. If you are using an older version of Excel or a Mac system, your interface could be slightly different.

How to Collapse the Excel Ribbon

The Excel ribbon takes up a lot of space if you are using a small display. You have the option to close the ribbon to create space. To minimize the ribbon, double-click one of the ribbon tabs.

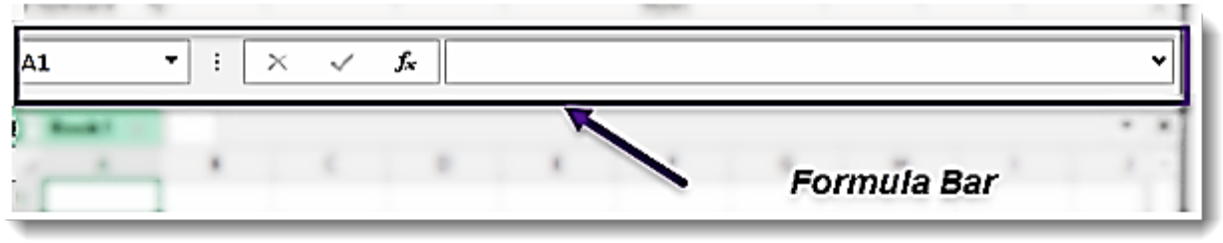


Alternatively, you can use the shortcut keys CTRL and F1 keys simultaneously.

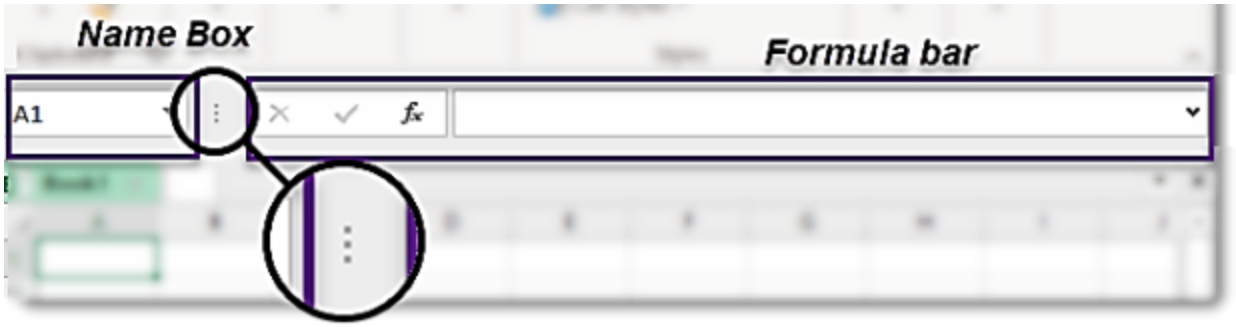
Double-click any tab to view the ribbon again, or use the shortcut keys CTRL and F1.

FORMULA BAR

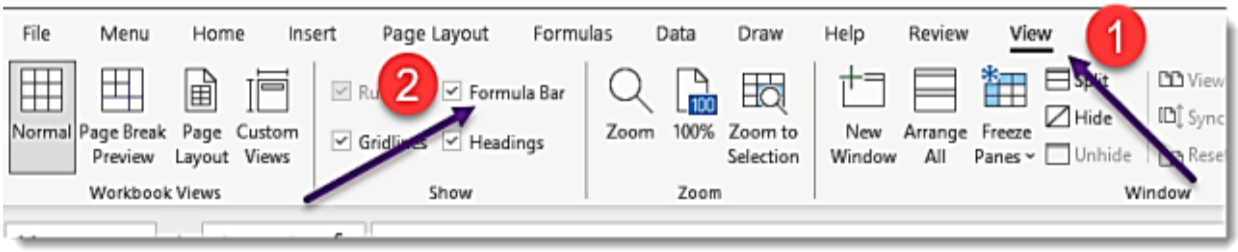
Below the Excel ribbon is the formula bar.



The formula bar has two parts; the Name box to the left and the actual formula bar to the right, separated by three dots.



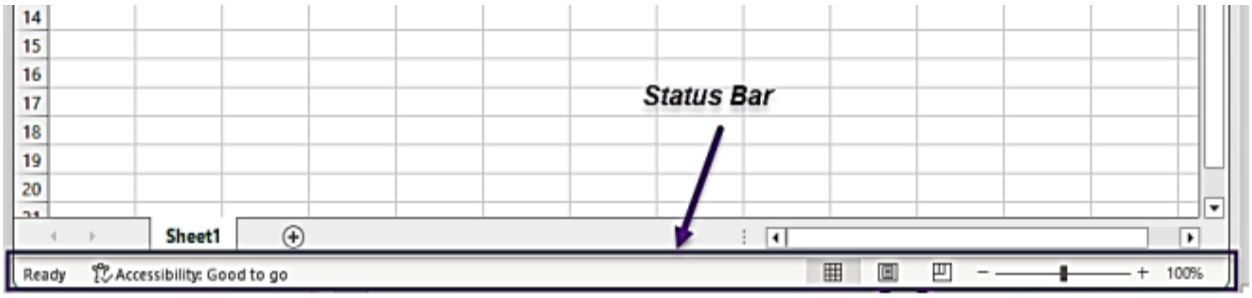
If the Formula Bar does not appear on your screen or you accidentally turn it off, go to the **View** tab and check the Formula Bar check box.



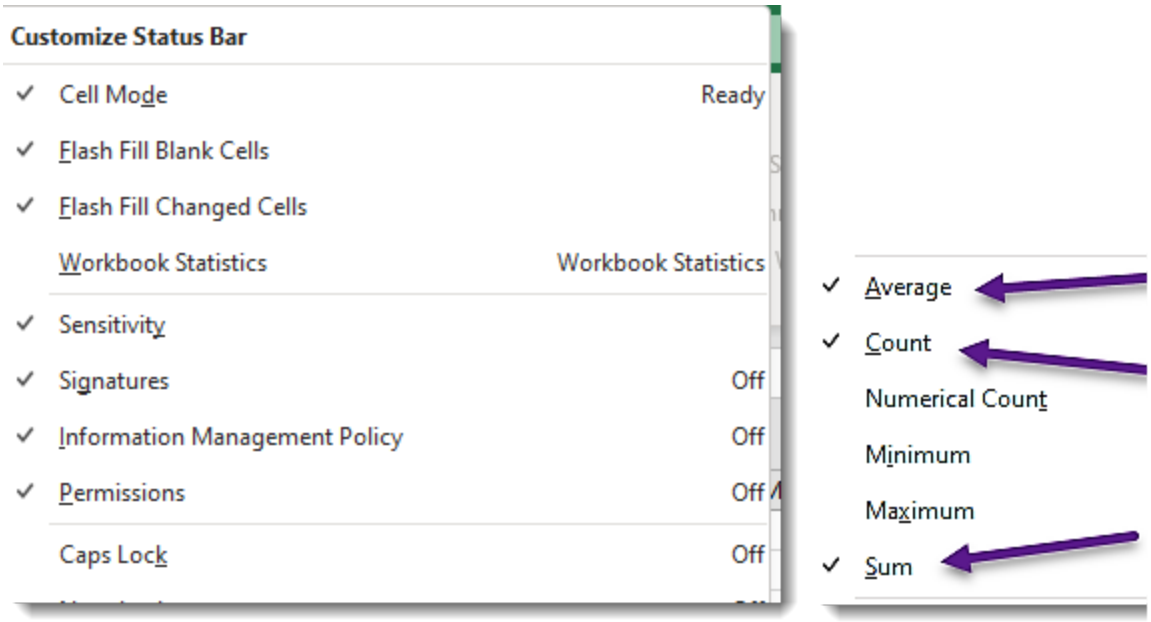
You can deactivate the formula bar if you don’t need it to create more room on your screen.

STATUS BAR

The status bar is located at the bottom of the Excel window, which is relatively small but contains information that is displayed when using Excel.



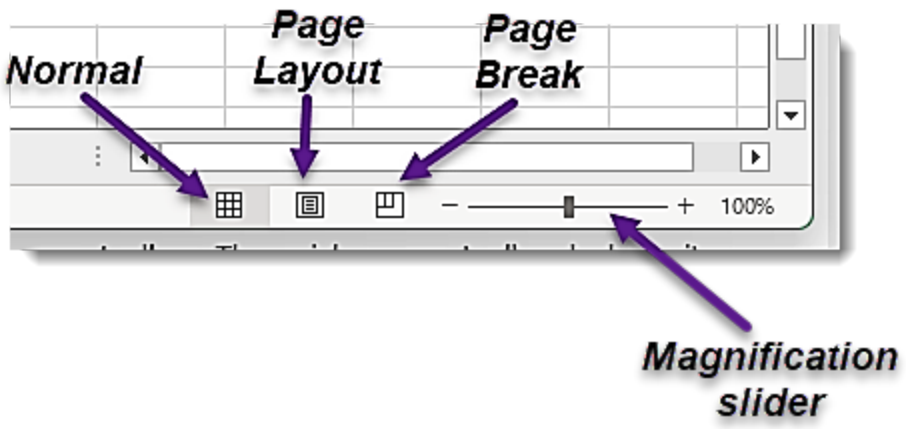
You can quickly personalize the status bar by right-clicking on it to display a list of options to choose from, which you want to appear on the status bar.



A checkmark signifies the item is active or will appear in the status bar. The **Sum** with a check mark means anytime you highlight numbers, they will be computed to get their total automatically.

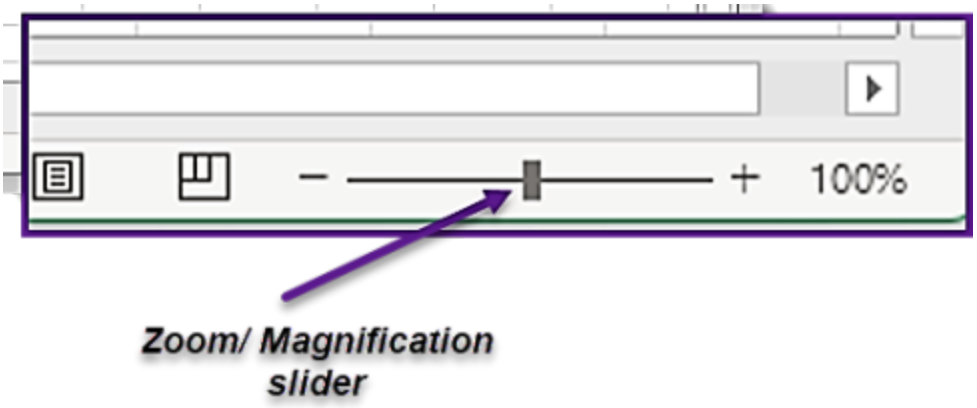
ZOOM VIEWS

Towards the right corner of the status bar, you have the zoom views and magnification slider.

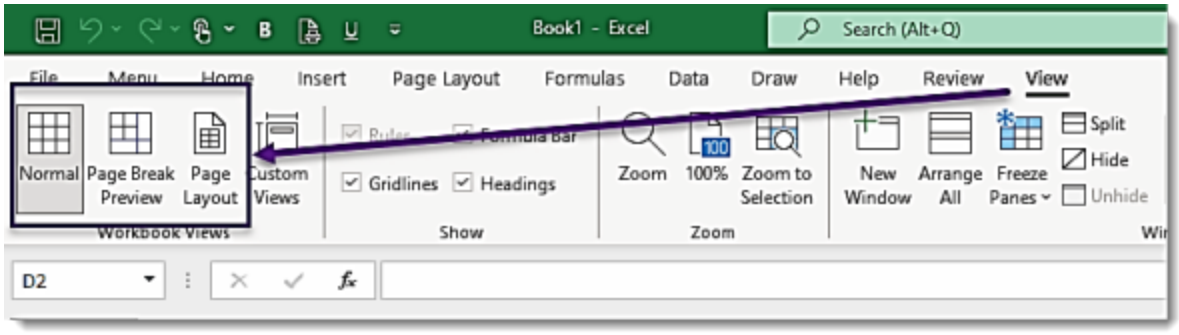


By default, the current view is set to Normal; this is what you see when you open a blank workbook. Then you have the page layout followed by the page break view. With these buttons you can quickly change the view of the worksheet.

The magnification or zoom slider allows you to zoom in or out of the active worksheet view.



However, the zoom buttons can also be accessed through the **View** tab.

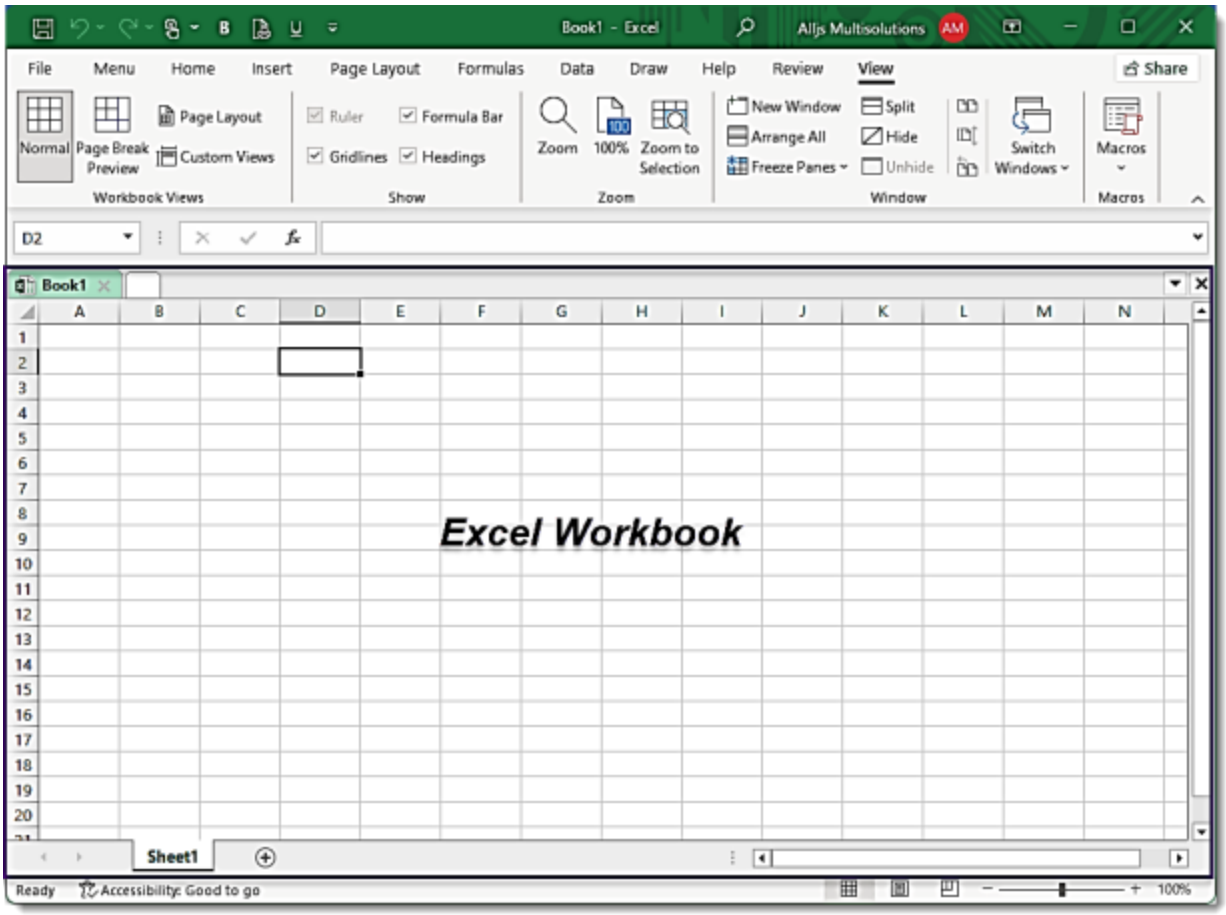


LESSON 2

EXCEL WORKBOOK STRUCTURE

THE WORKBOOK

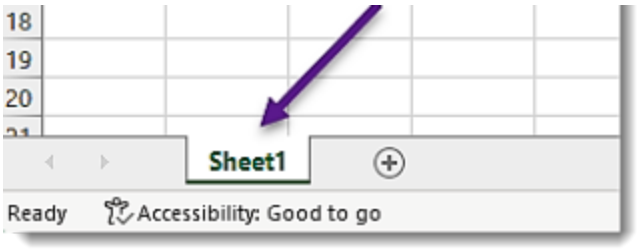
The workbook is the area between the formula bar and the status bar.



The workbook area is where all your data is going to appear and is what you will save as your Excel file.

THE WORKSHEET

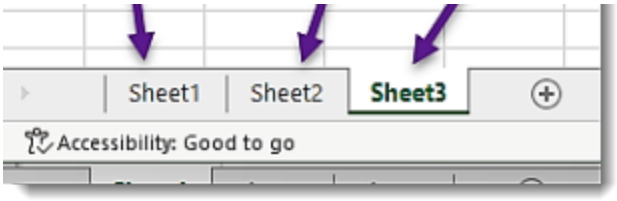
A workbook is made up of worksheets in Excel. The first sheet is named **Sheet1** by default.



The **plus (+)** button creates an additional worksheet with a single click.



The more you click the **plus (+)** button, the more worksheet you create.



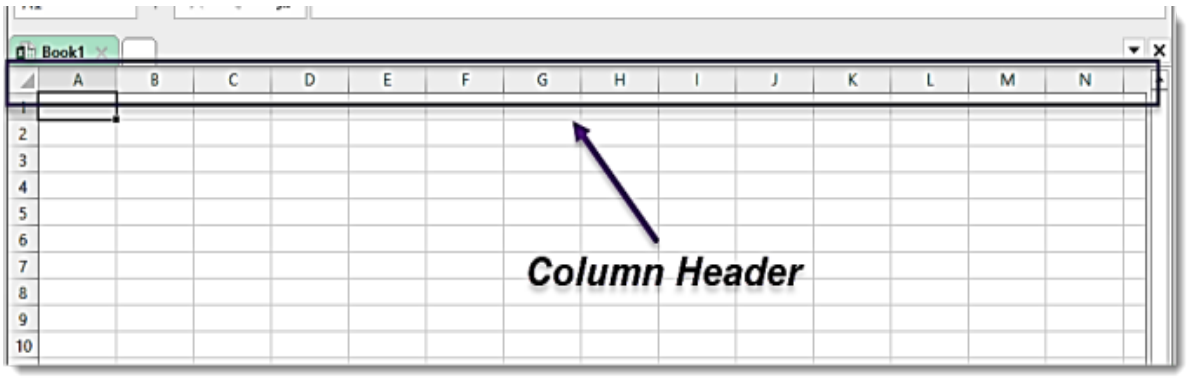
Each worksheet is independent of the other but shares the same file name. The older versions of Excel limit the number of worksheets inside a single workbook to 255. Recent versions of Excel restrict the number of worksheets

based on your system memory. The bigger your memory, the more worksheets you can create in a single workbook.

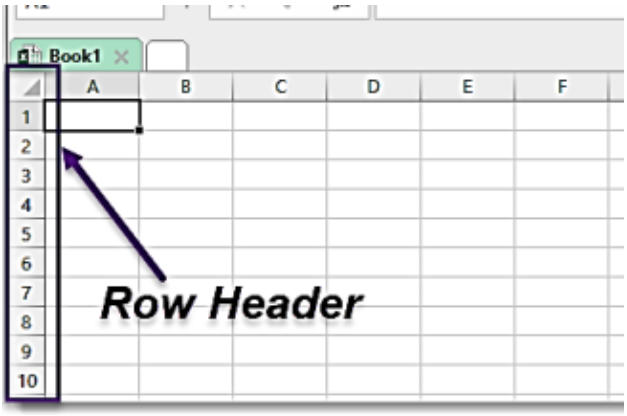
So, if you have a workbook meant to store daily reports, you will need 365 worksheets to keep track of your daily data. Whatever you do with the number of worksheets you want to create in a workbook, your system will eventually slow down if you deal with big data on multiple worksheets.

GRIND LINES

In Excel, gridlines are the gray lines that run horizontally and vertically between cells on a worksheet. At the top, you have the header labeled alphabetically to define the columns.



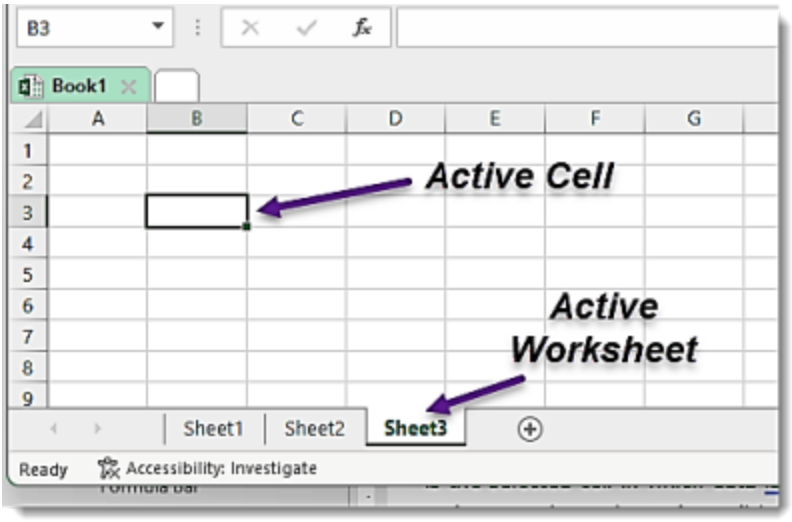
You have the header labeled numerically at the side to define the rows.



The gridlines help differentiate cells and make it easy for users to move around the worksheet's columns and rows.

CELL

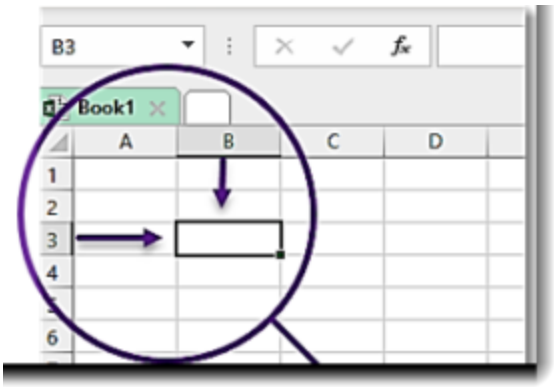
A cell is a small rectangle or box on an active Excel worksheet.

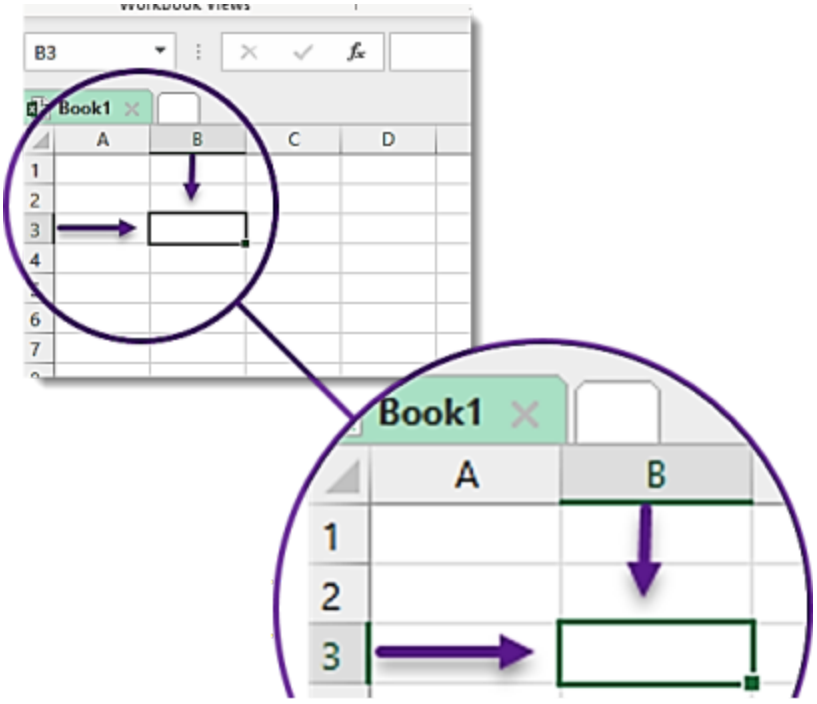


The active cell is the one that is selected with a bolder rectangle and where your data appears when you start typing.

You can only have only one active cell at a time to enter data.

Each cell has its address identified using the row and column headers.



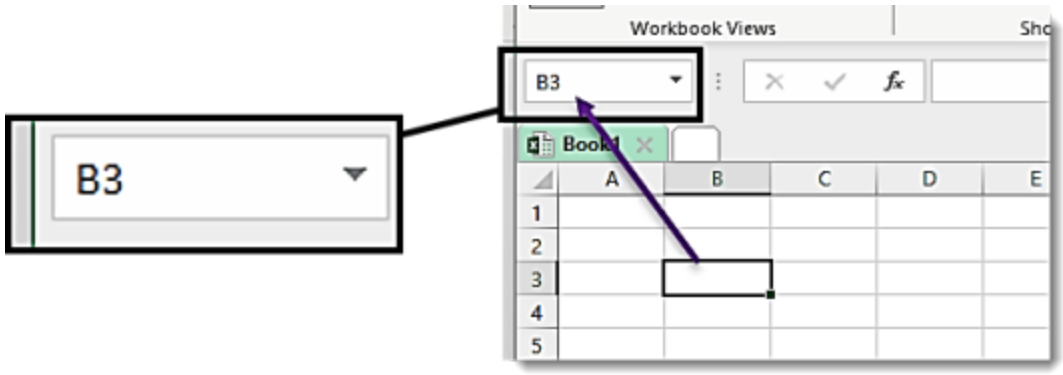


The intersection between a column header and a row header gives a cell its identity.

As illustrated above, the active cell is on column **B**, row **3**.

So, the active cell is **B3.**

You can also identify a cell address using the **Name Box** on te formula bar.

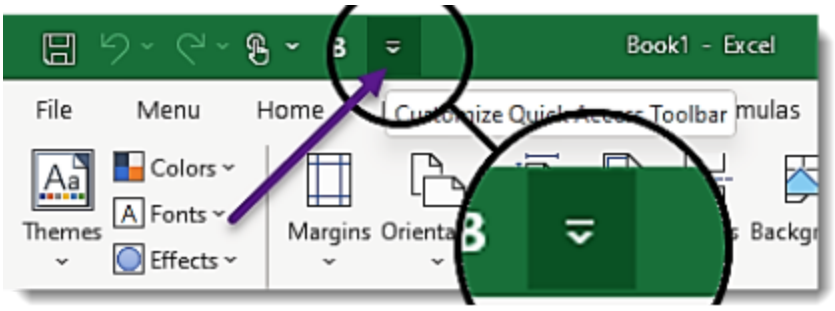


This allows you to refer to the data using the cell address on an Excel worksheet.

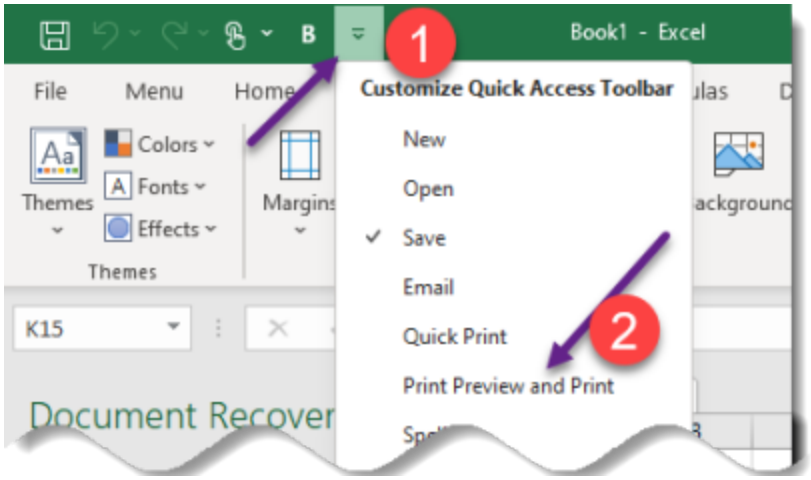
CUSTOMIZING THE EXCEL QUICK ACCESS TOOLBAR

Excel provides quick, easy, and direct access to some of the most frequently used features thanks to the Quick Access Toolbar. The quick access toolbar is quite different from what you see on a Mac, but the concept remains the same.

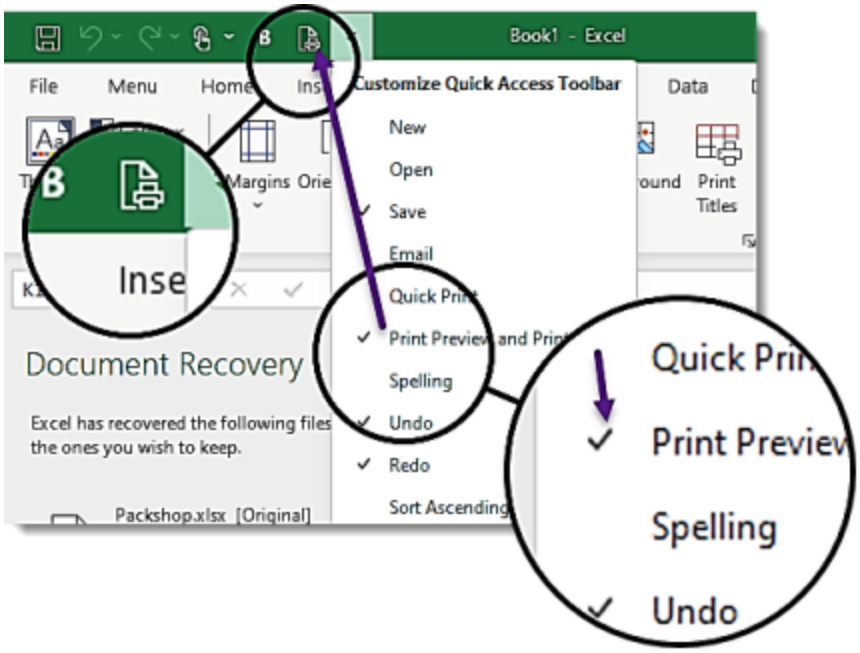
The quick access toolbar can be customized, and when you click on the drop down arrow, as illustrated below, you gain access to the Customized Quick Access Toolbar drop-down list.



For example, it takes about three steps to get to the print preview command. One way to reduce stress is by enabling the print preview command, which can be done by selecting the drop-down arrow on the quick access toolbar and checking the corresponding option.

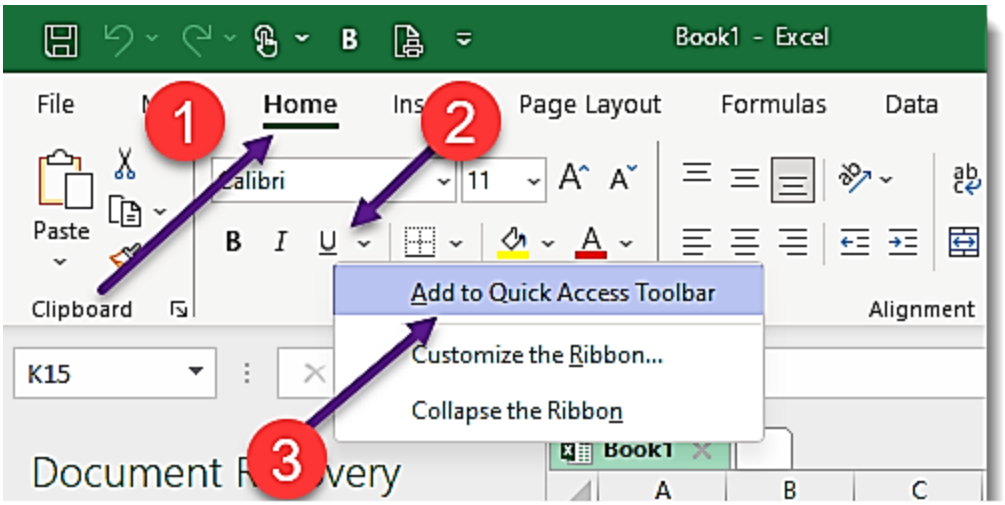


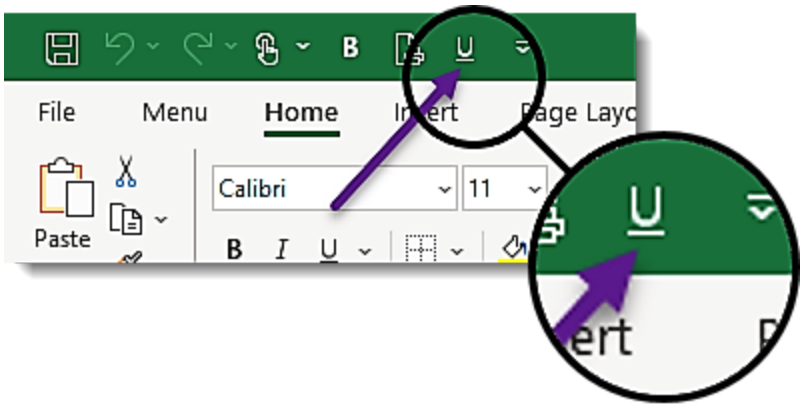
Once you click on a command, a checkmark will appear next to it to indicate that it has been added to the quick access toolbar.



You can also add a command to the quick access toolbar by right-clicking on the corresponding command in the ribbon and selecting "**Add to Quick Access Toolbar**." For instance, if you frequently use the **Underline**

command in the **Font** group of the **Home** tab, you can right-click on the **Underline** (U) icon and select the option to **Add** to **Quick Access Toolbar**.





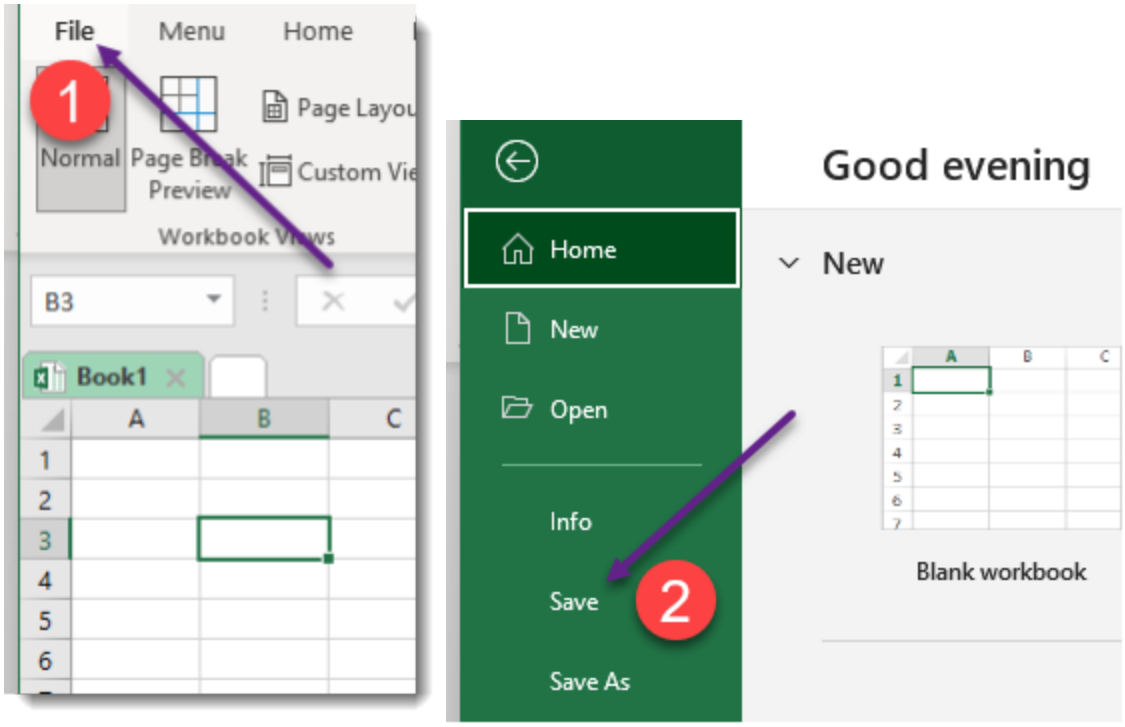
As you progress through this Excel guide, consider adding any frequently used commands to the quick access toolbar in order to enhance your productivity.

SAVING AN EXCEL DOCUMENT

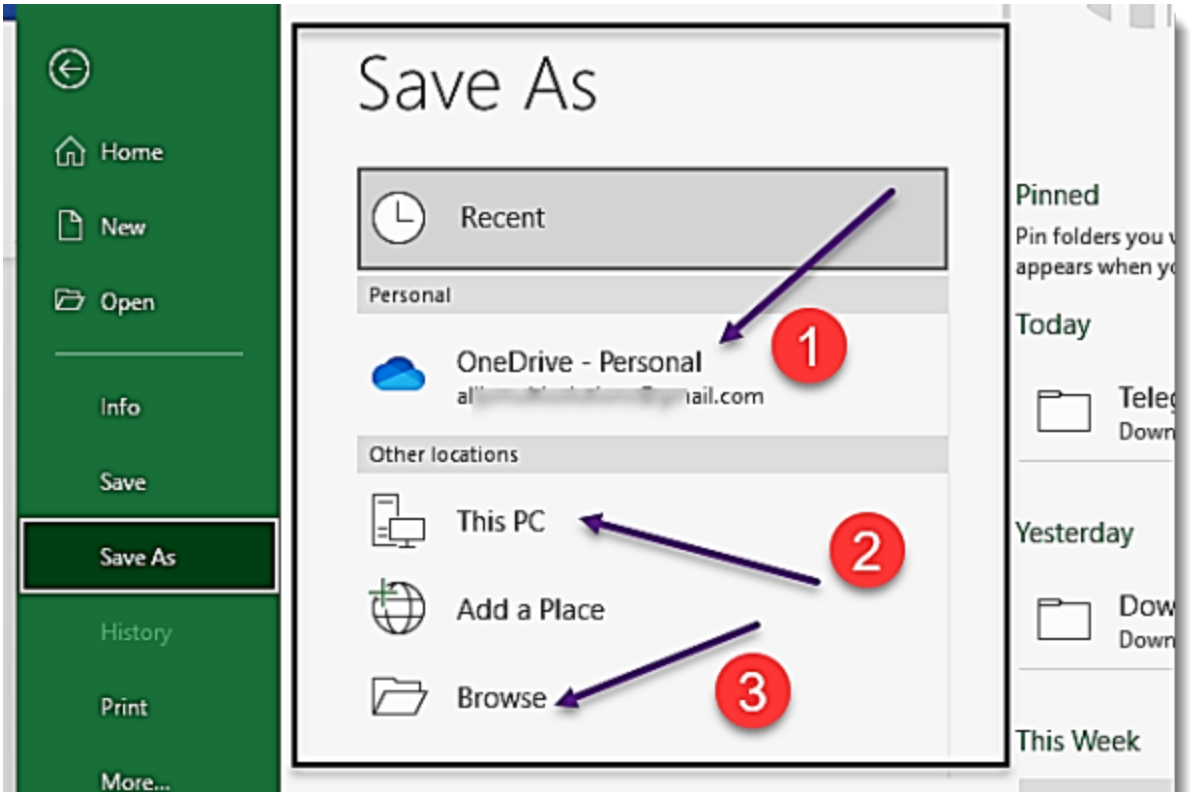
Start by creating a new blank workbook and reviewing the lessons we have covered so far.

Familiarize yourself with the Excel interface, and then be sure to save the workbook. It's important to save your workbook frequently to avoid losing any data.

Go to the **File** tab, scroll to the **Save** button, and click on it.



In case you are using the most recent version of Excel, you will be directed to the **Save As** command option, which provides you with three choices to choose from.

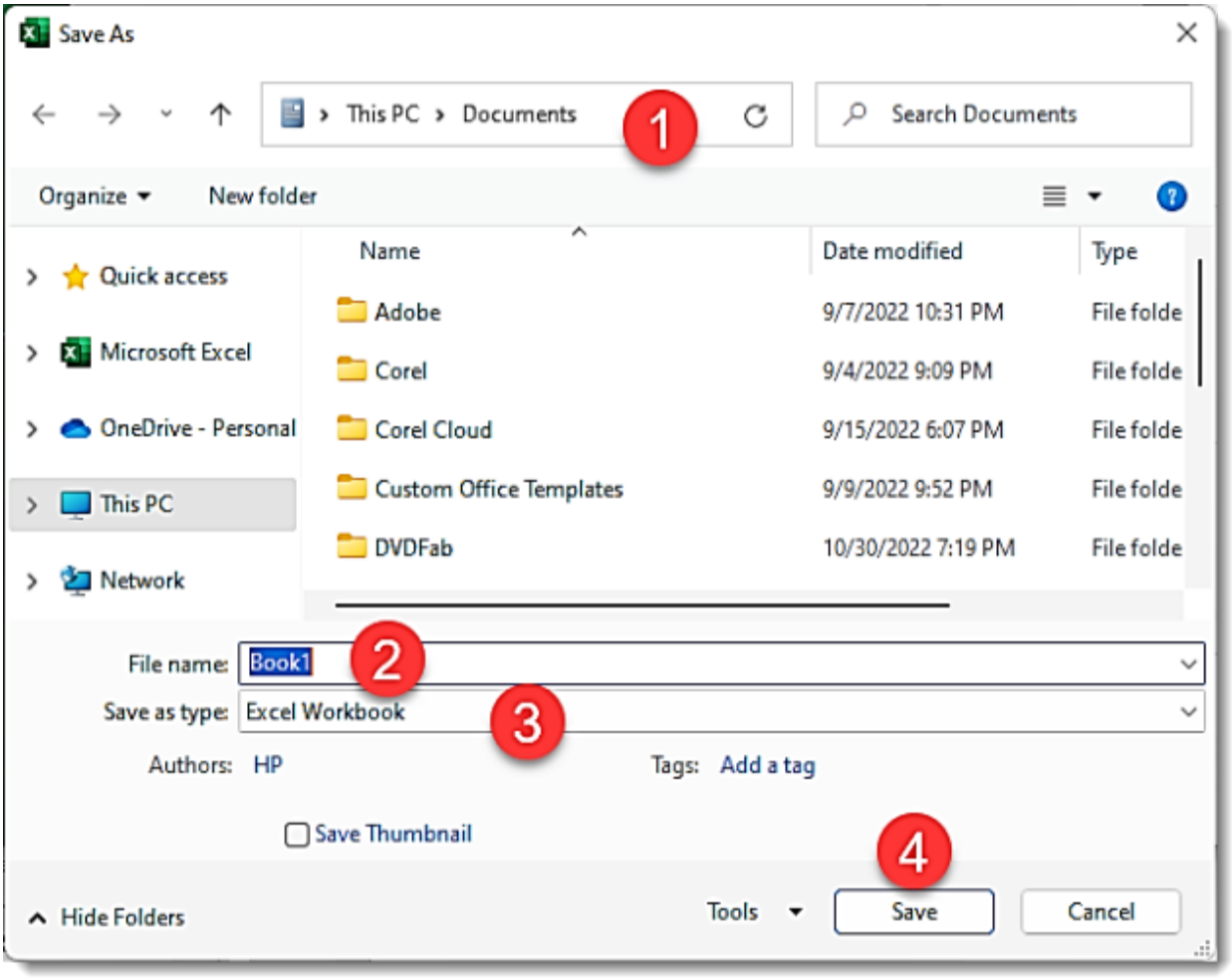


1. **OneDrive** allows you to save your workbook using your Microsoft account on the Microsoft cloud storage platform.
2. This PC allows you to save your file on your computer.
3. **Browse** gives you additional privileges to choose where to save your file. This allows you to store your file on an external drive.

So, click on **Browse** to make your choices more flexible.

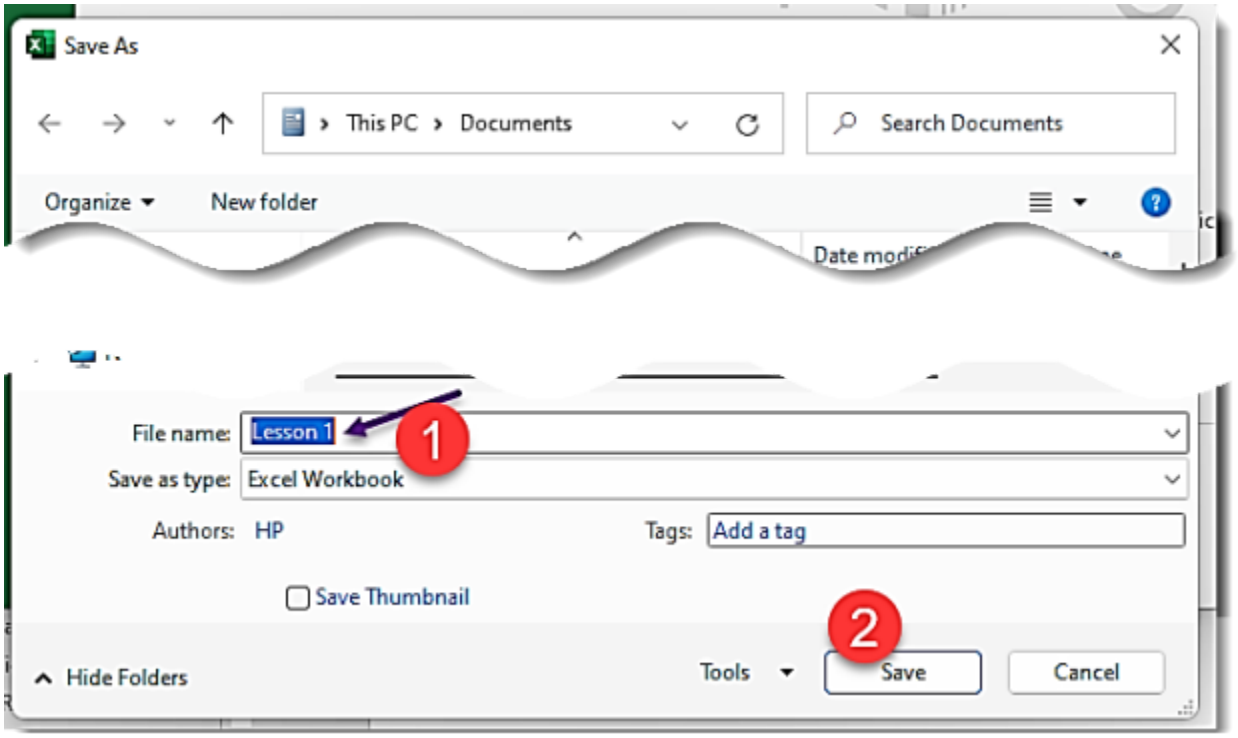


You will see the **Save As** dialog box on your screen, as illustrated below.

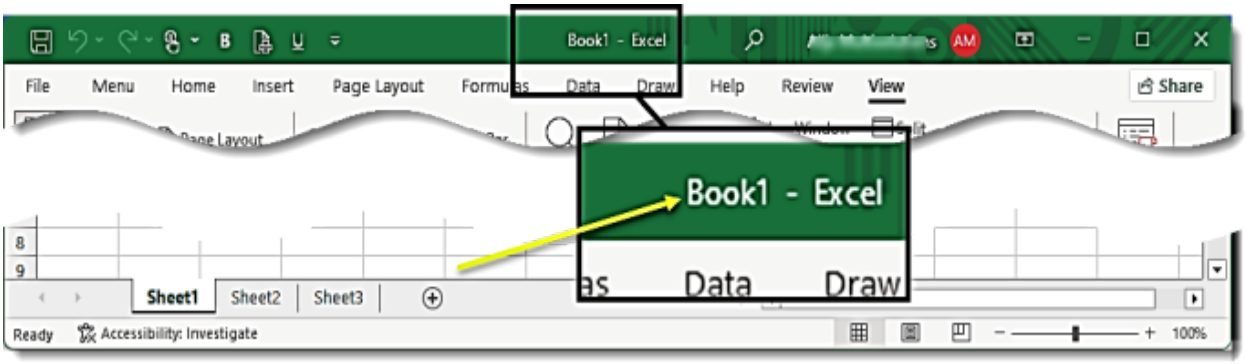


1. Allows you to select the location where you want to save your Excel file in.
2. **File name** is where you insert the name you want to give to the Excel workbook.
3. Save As type allows you to select the file type in which you want to save the Workbook. Here, you can save your file as a PDF.
4. When done, you click the **Save** button to complete the process.

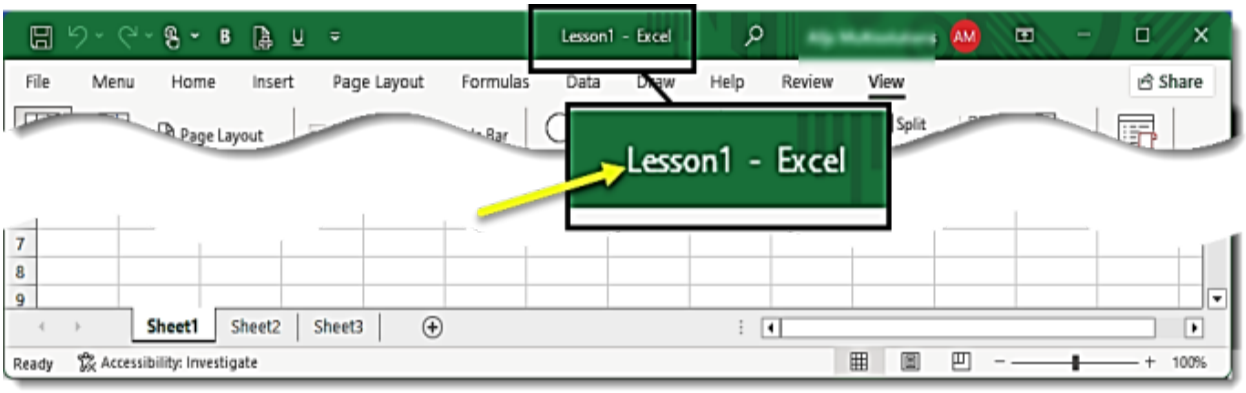
Your Excel file, when saved, is issued a **.xlsx** or **.xls** extension as its file type.



After giving your file a name and saving it in your desired location, the name will replace **Book1** initially used to name the workbook.



Before

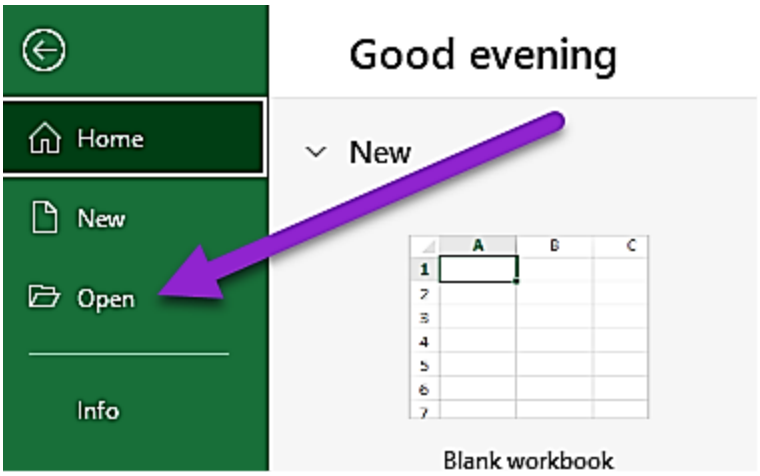

Lesson1 - Excel
File
Menu
Home
Insert
Page Layout
Formulas
Data
Draw
Help
Review
View
Share
Page Layout
Split
Lesson1 - Excel
7
8
9
Sheet1
Sheet2
Sheet3
Ready
Accessibility: Investigate
100%

After

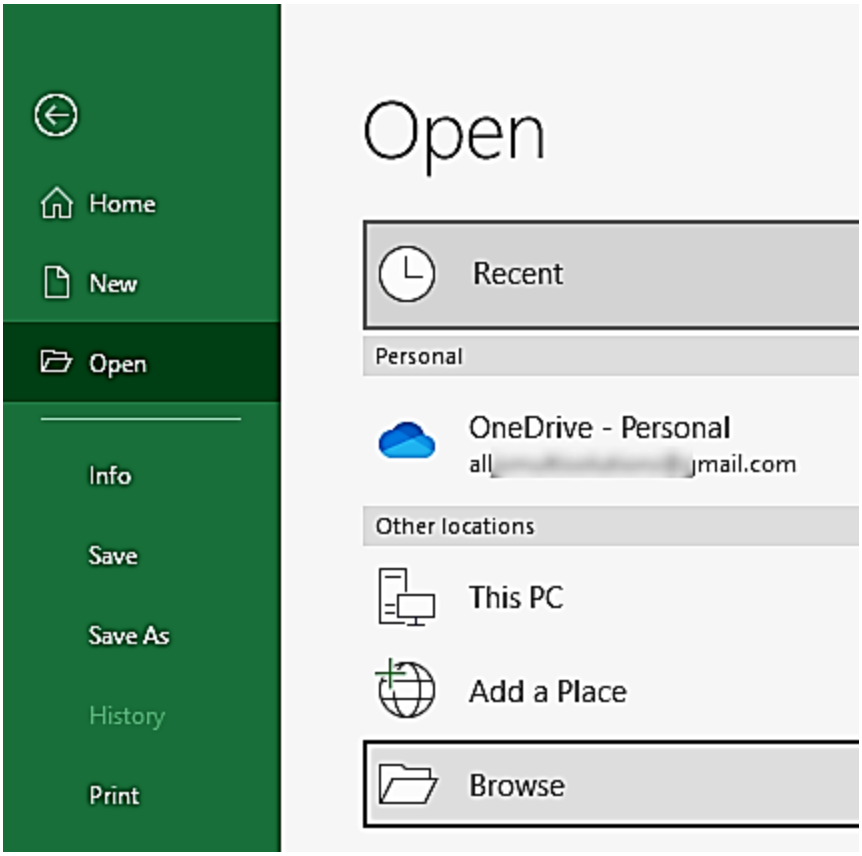
OPENING AN EXISTING DOCUMENT

To access a saved file from your computer, external device, or cloud storage, simply navigate to the **File** tab.

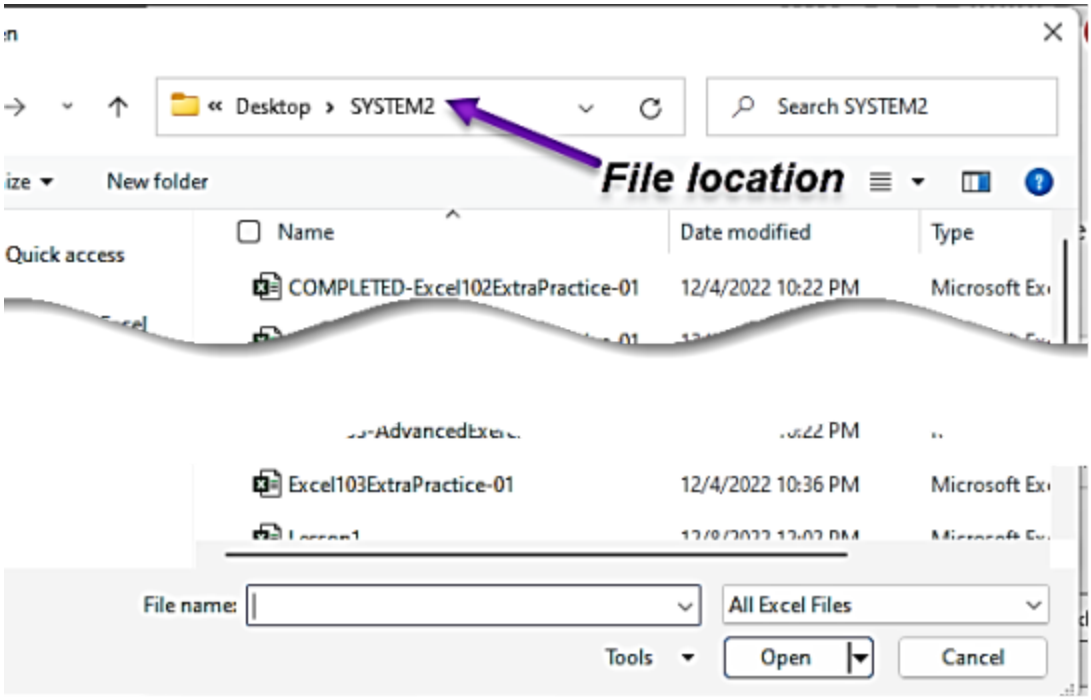
Next, click on **Open** button.



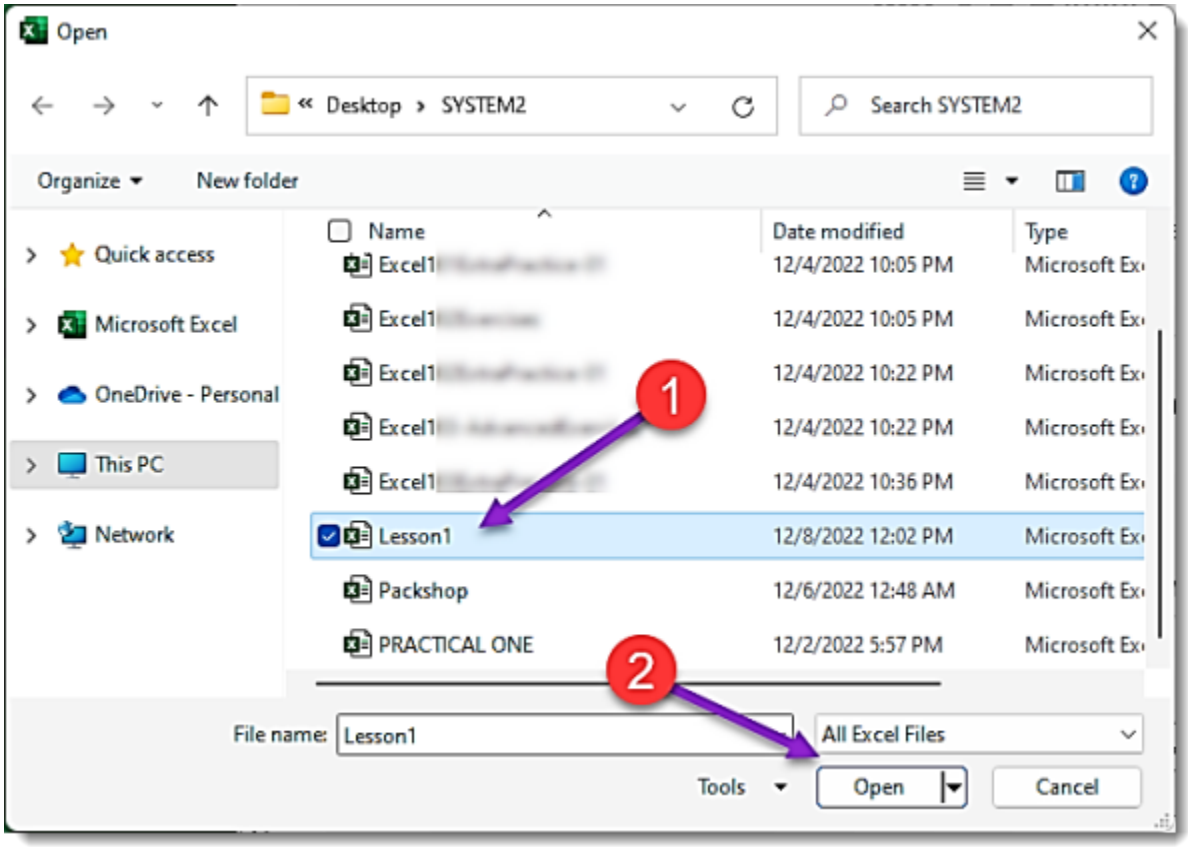
Next, locate the file in its location and then select the file location.



Select the **Browse** button to select the file location on your computer.



After you have arrived at the file location, choose the desired file from the list and then click the **Open** button to complete the process.


Open
Desktop › SYSTEM2
Search SYSTEM2
Organize
New folder
Quick access
Microsoft Excel
OneDrive - Personal
This PC
Network
Name
Date modified
Type
Excel1
12/4/2022 10:05 PM
Excel1
12/4/2022 10:05 PM
Excel1
12/4/2022 10:22 PM
Excel1
12/4/2022 10:22 PM
Excel1
12/4/2022 10:36 PM
Lesson1
12/8/2022 12:02 PM
Packshop
12/6/2022 12:48 AM
PRACTICAL ONE
12/2/2022 5:57 PM
1
2
File name:
Lesson1
All Excel Files
Tools
Open
Cancel

EXERCISE

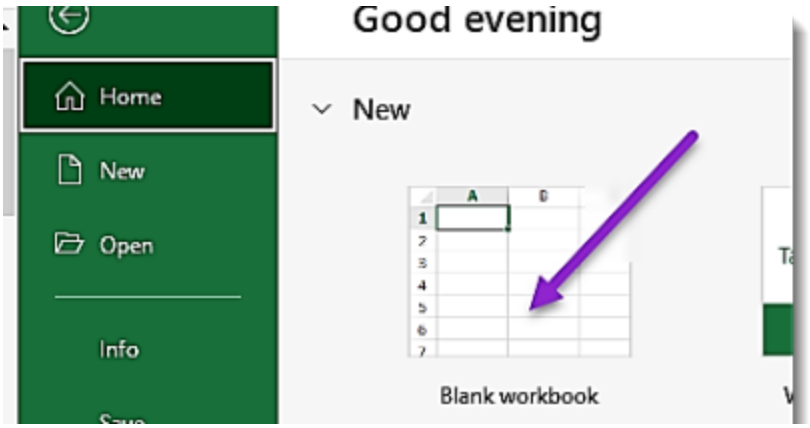
1. What is the file extension of the Excel version you are using after saving your first file in Excel?
2. How many worksheets did you see when you created a blank workbook?
3. How many worksheets can you create in a workbook using your own version of Excel?
4. How does the Quick Access Toolbar improve your workflow?
5. How do you customize the Quick Access Toolbar?

LESSON 3

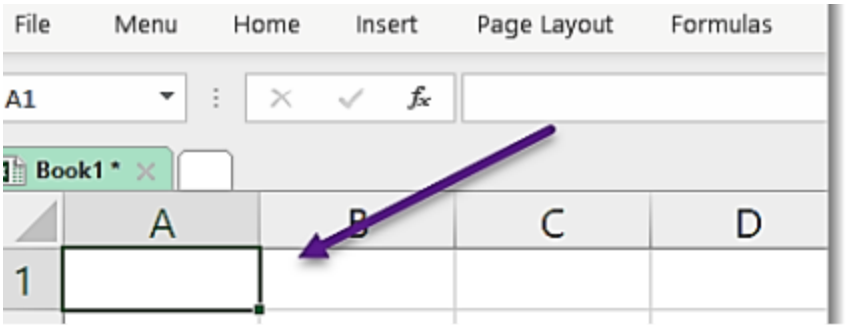
ENTERING AND EDITING DATA

One of the fundamental tasks you'll need to accomplish when working with Excel is inputting and modifying data. To do so, you'll first need to create a new workbook or open an existing one.

Click on the **Blank Workbook** button on the excel start screen.



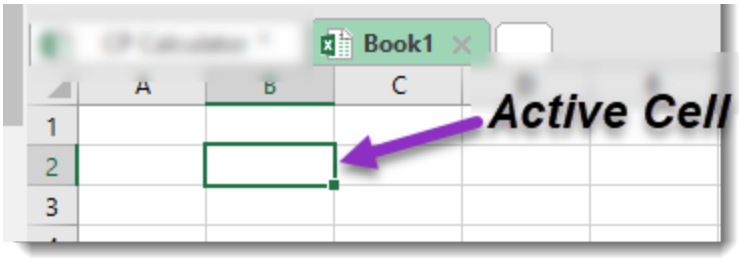
In Excel, when you initiate a new blank workbook, the active cell is automatically positioned in the first row and first column, which is designated as cell **A1**.



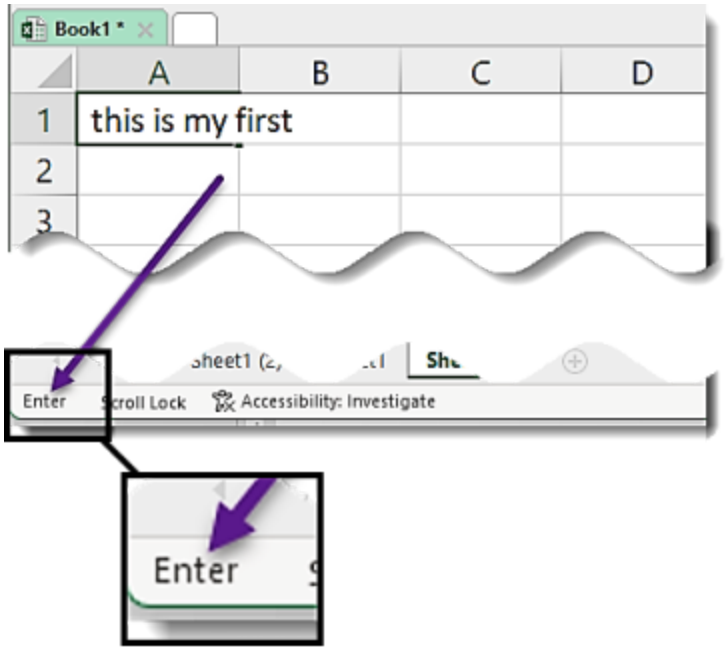
To navigate the worksheet, you can use your mouse or the arrow keys on your keyboard to move in any direction (up, down, left, or right).



Additionally, you can use the Home, End, Page Up, and Page Down keys on your keyboard to navigate within a worksheet. Keep in mind that the cell where you are currently positioned is considered the **active cell** and will be where any typed data will appear. The active cell is easily identified by its bolder rectangular border.



As soon as you begin typing, the status bar located in the bottom left corner will indicate that you're in **Enter** mode.

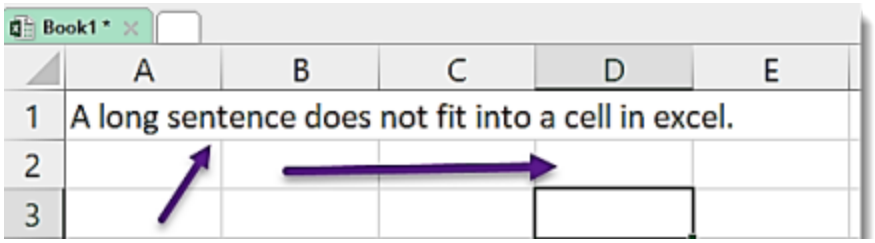


To return the Status bar to Ready mode, press the Enter key on your keyboard after finishing typing. If you need to interrupt your typing, you can do so by pressing the **Esc** key to erase the content.

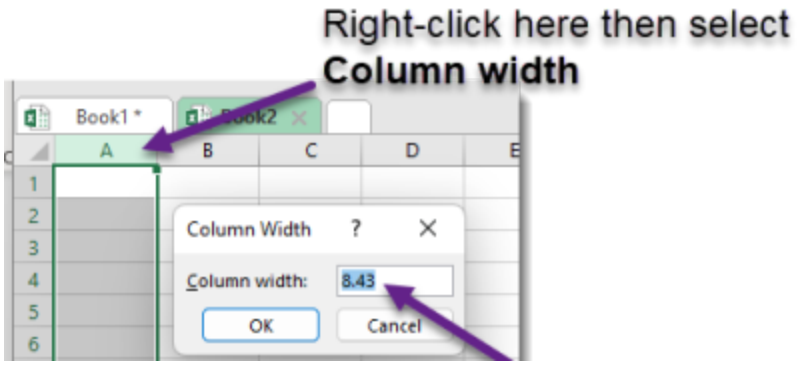
NOTE: If you click on a cell containing data and start typing, the new input will replace the existing data once you press the **Enter** key. Therefore, it's crucial to be careful and keep track of the active cell's location to prevent accidentally modifying your data.

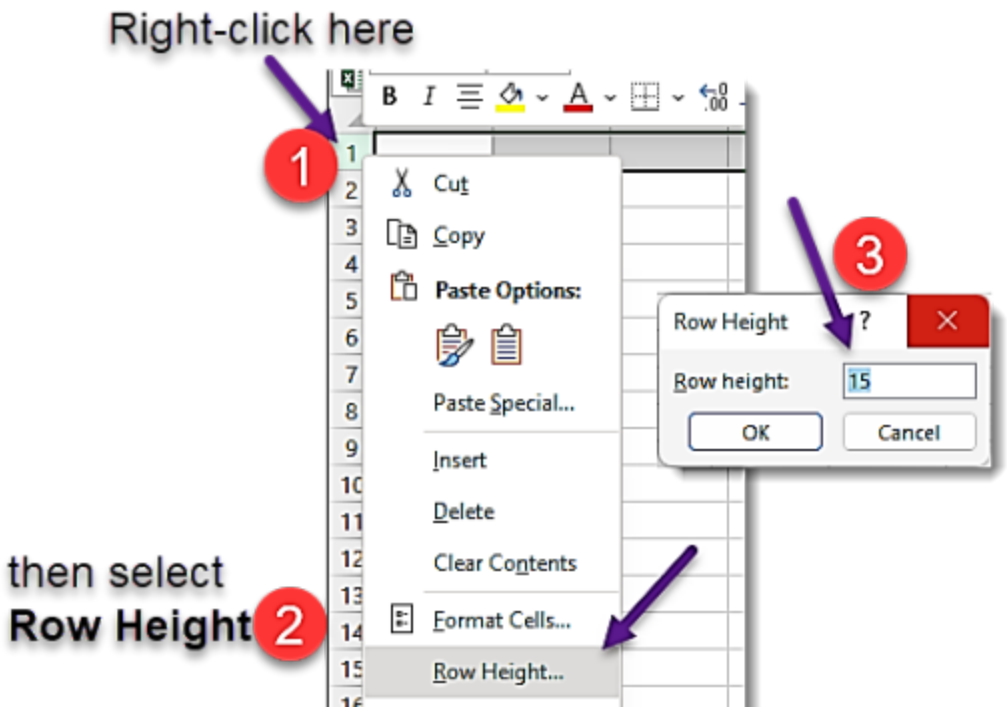
DEALING WITH LENGTHY SENTENCES

If you input a lengthy sentence in an Excel cell, it will exceed the cell's width and may not fit properly.

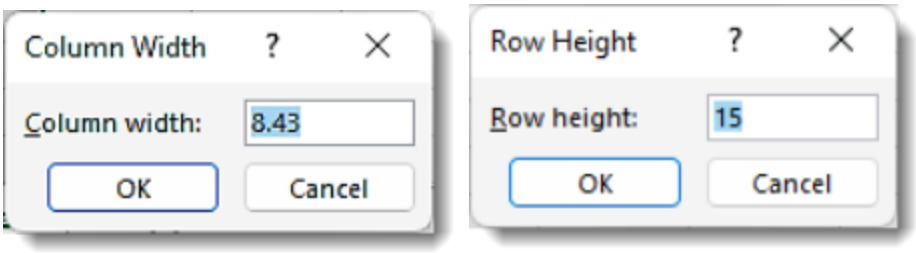


To view the default values for Column Width or Row Height, right-click on the column or row header and select the respective option. This is necessary because each cell has a preset dimension, with the default values being 8.43 for column width and 15.00 for row height.

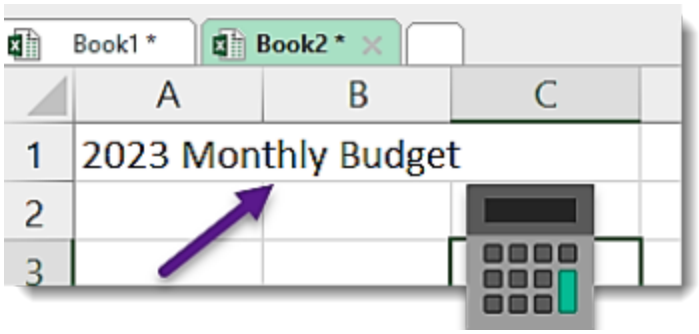




If you need to adjust the row height or column width in Excel to make them larger or smaller to fit, there are various methods to do so. One way is to right-click the headers and choose the option for Column Width or Row Height, where you can alter the default values. Determining the precise row height or column width of a cell can be a challenge.



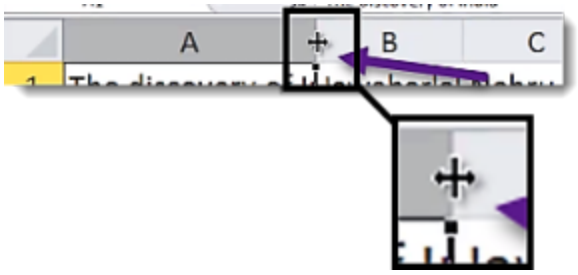
While this approach can be helpful in specific cases involving column or row specifications, it's generally more effective if you make use of the Manual or AutoFit method.



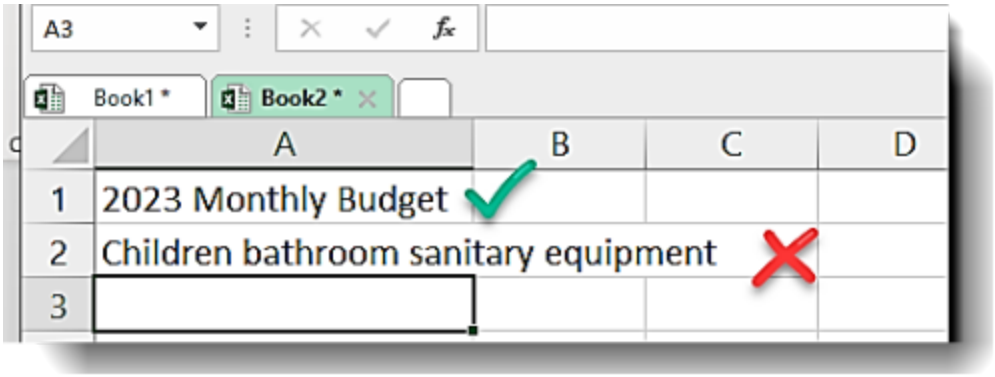
I strongly recommend you practice using your computer for a better learning experience.

ADJUSTING COLUMN OR ROWS MANUALLY

To manually adjust the size of columns or rows in Excel, you need to position your cursor on the boundary line of the column or row headers, then drag the mouse to the desired width or height of your cell content.



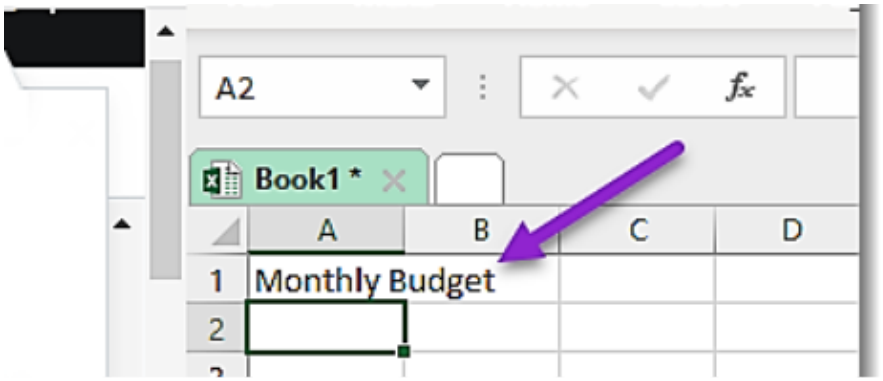
This method might work fine for some cells, but when you enter data into another cell within a row or column, you might start having issues because they do not look uniform.



That now leaves us with the third option called **AutoFit**, which is much more convenient in many scenarios where you have to adjust column width or row height.

BASICS OF TEXT AND NUMERIC DATA

So let us start by entering our first data in cell **A1.** Type in "**Monthly Budget**" in cell A1 as your header.



Go to;

Cell **A3** enter "Bills"

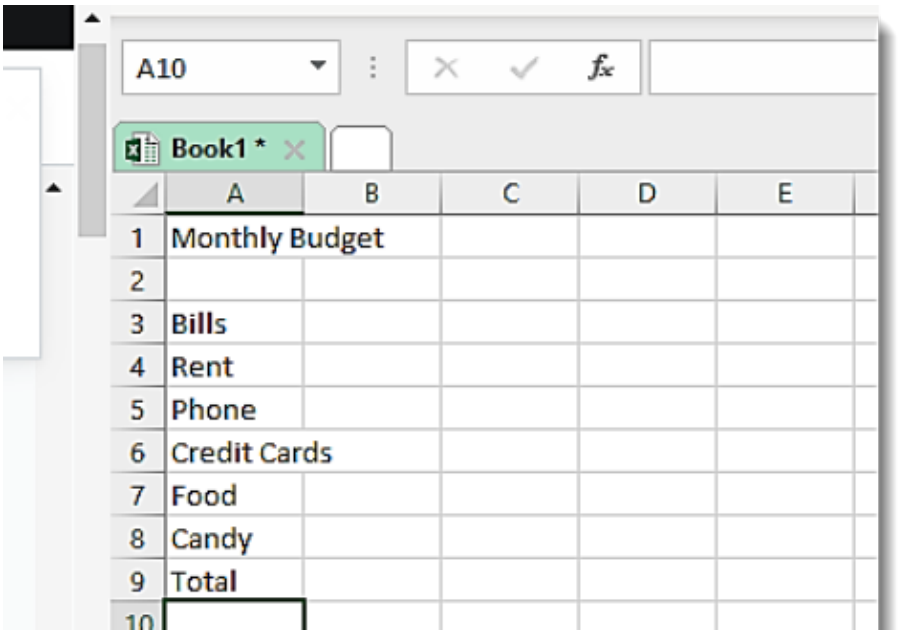
Cell **A4** enter "Rent"

Cell **A5** enter "Phone"

Cell **A6** enter "Food"

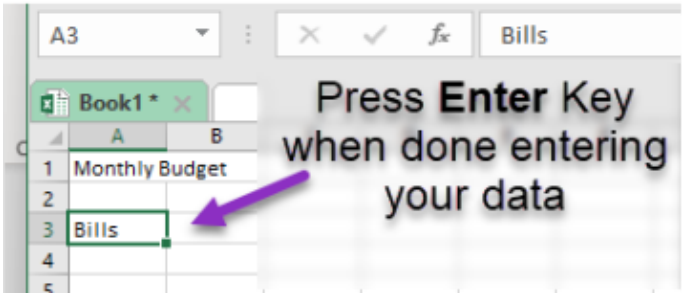
Cell **A7** enter "Candy"

Cell **A4** enter "Total"

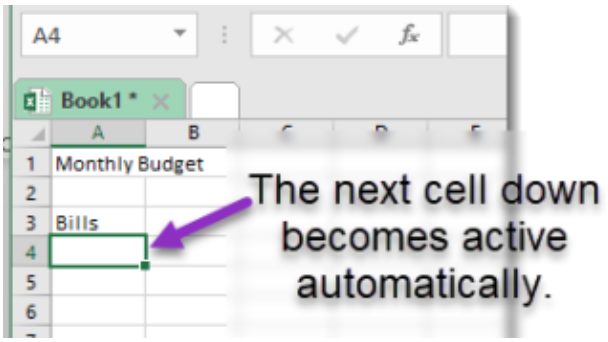


Remember, when done entering data in a cell, hit the **Enter** key on your keyboard to make the next cell below become the active cell.

For example, if you are in cell **A3,** after typing in **Bills**, press the **Enter** key to make cell **A4** active automatically.

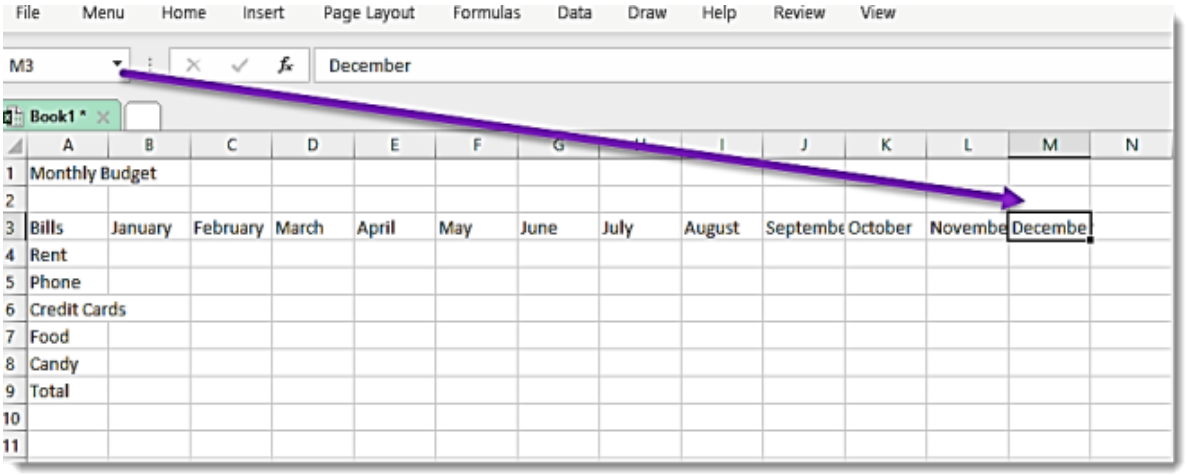


Before

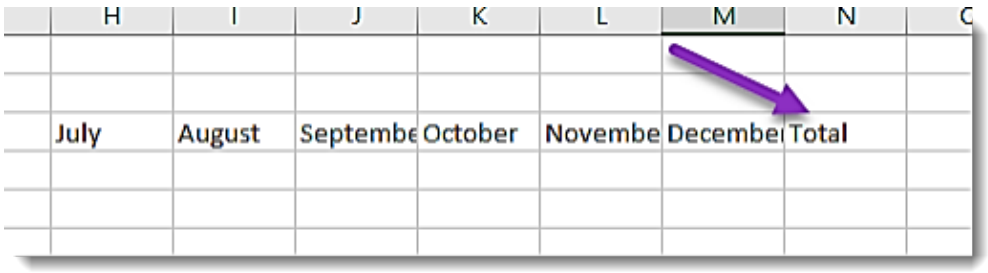


After

Next, you go to cell **B3** and enter the month of January. Continue with the next cell by your right until you get to December in cell **M3.**

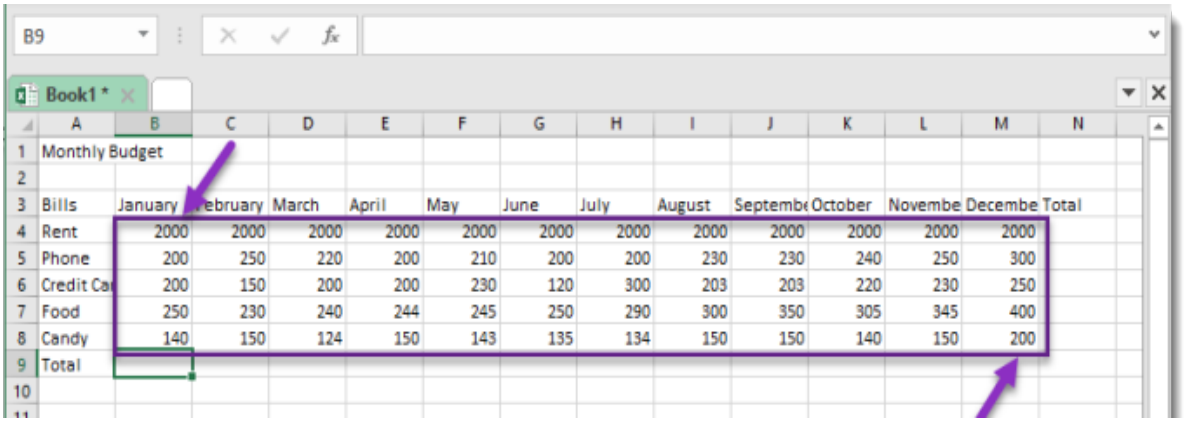


Next, go to cell **N3** and type in **"Total".**



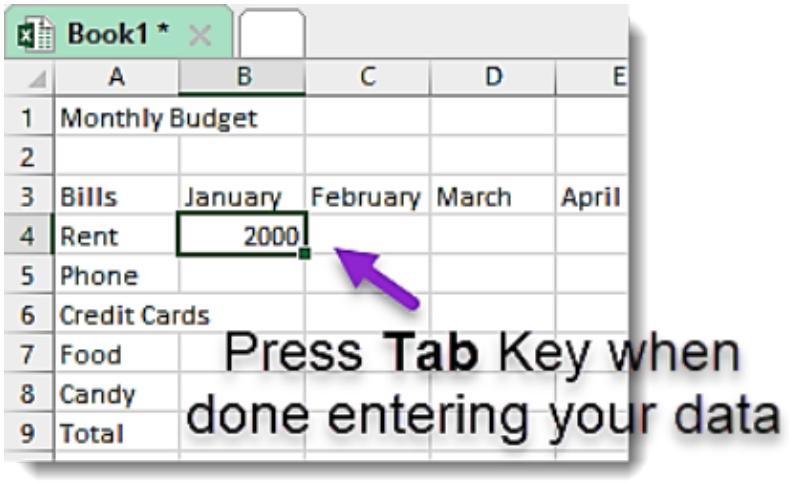
Congratulations! You just created the heading and labels for a monthly budget.

Next, you start entering the numerical values in cell **B4** until you get to Cell **M8** as illustrated below.

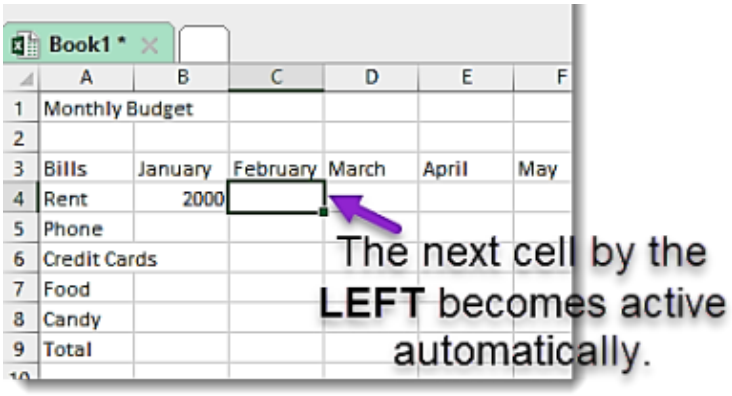


Note: when done entering data in a cell, press the **TAB** key to make the next cell by your left become active.

For example, if you are in cell **B4,** press the **TAB** key after typing in the value 2000 to make cell **C4** active automatically.



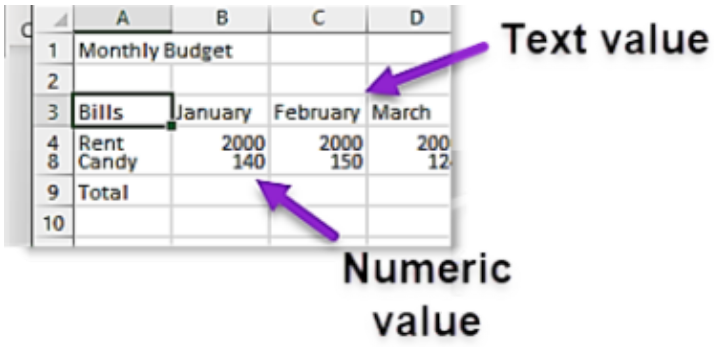
Before



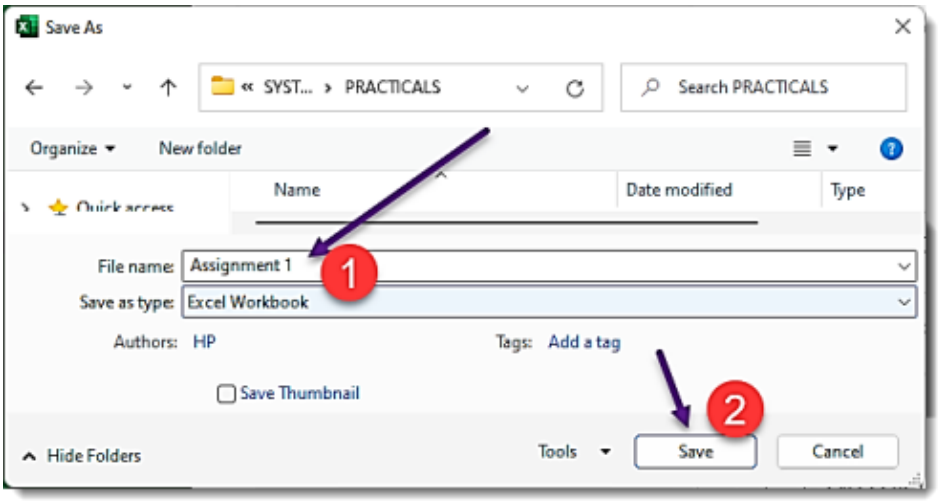
After

When entering data in a cell, the **Enter** and **Tab** keys on your keyboard are Excel shortcuts for navigating cells within a worksheet.

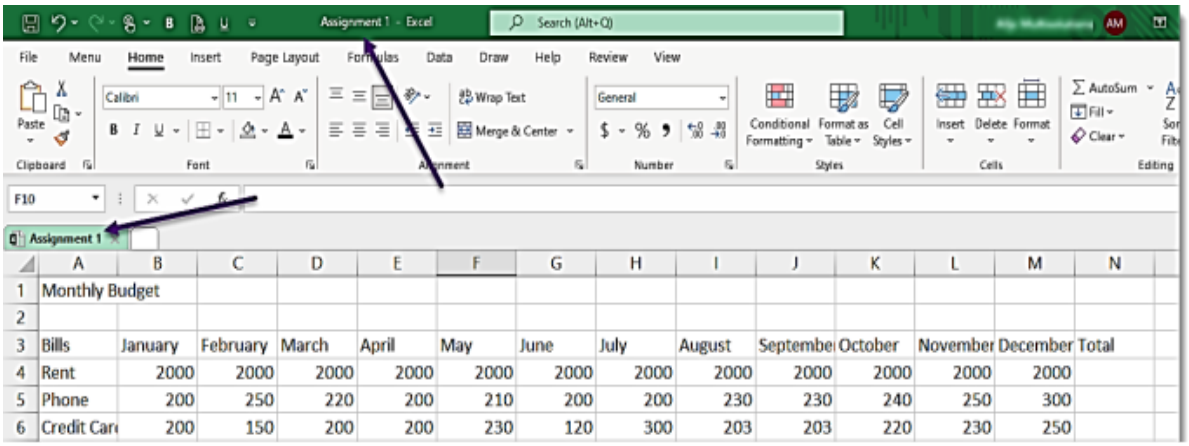
In Excel, the characters entered through your keyboard are known as Text Values, which are distinct from Numeric Values.



Finally, save the workbook using the File name **Assignment 1**.



When done, the temporary workbook name will be replaced with the new file name you just assigned, as illustrated below.

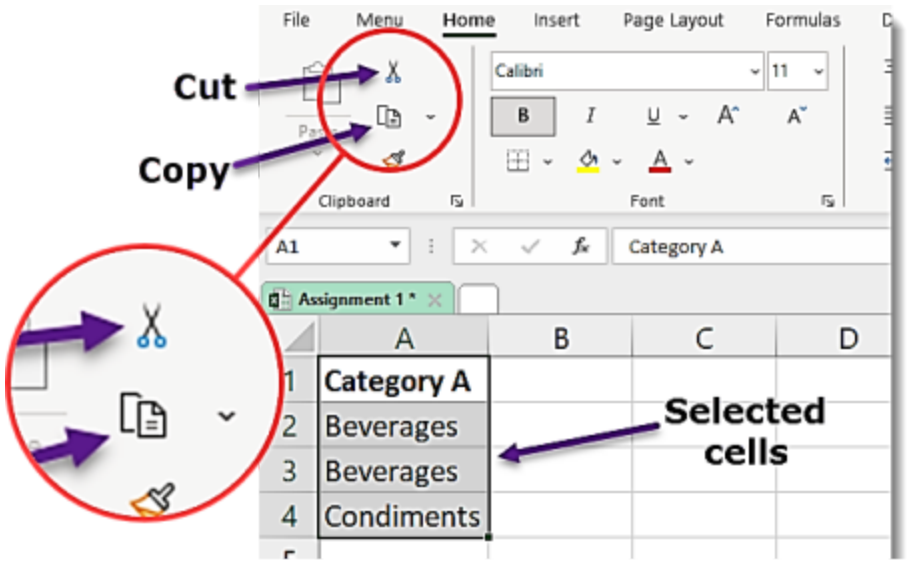


CUT, COPY, AND PASTE DATA

Apart from various other tasks that can be performed in a workbook, you have the option to utilize the **Copy**, **Cut**, and **Paste** commands to transfer and duplicate your data from one location to another within the same worksheet, between worksheets, or even between different workbooks.

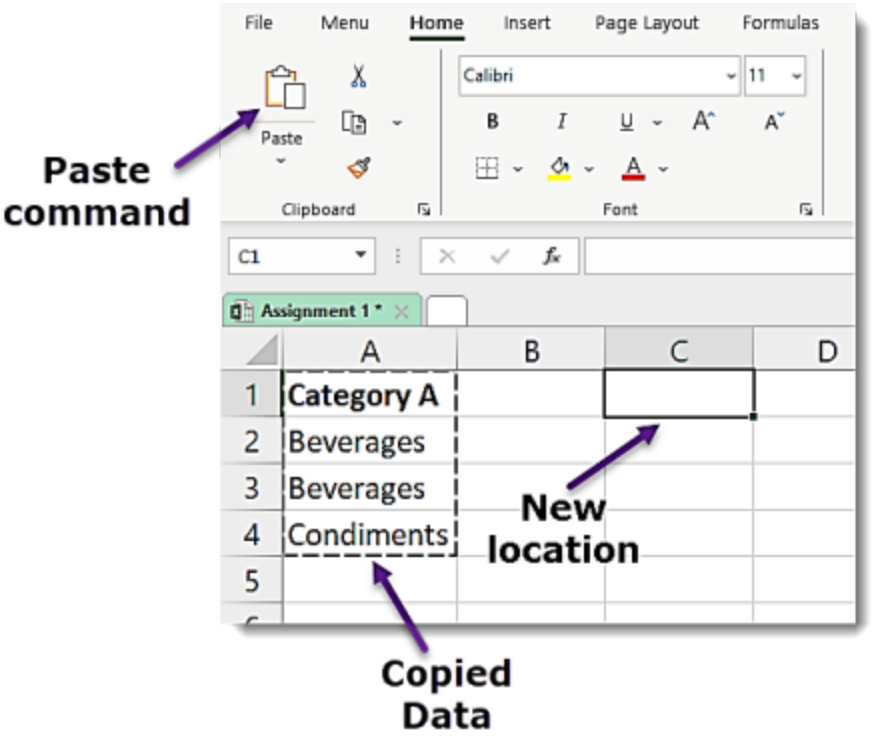
It is a must to select the cell or range of cells before you can use the **Cut**, **Copy** and **Paste** commands.

When done selecting the data, choose the **Cut** or **Copy** command on the **Home** tab of the Excel ribbon.

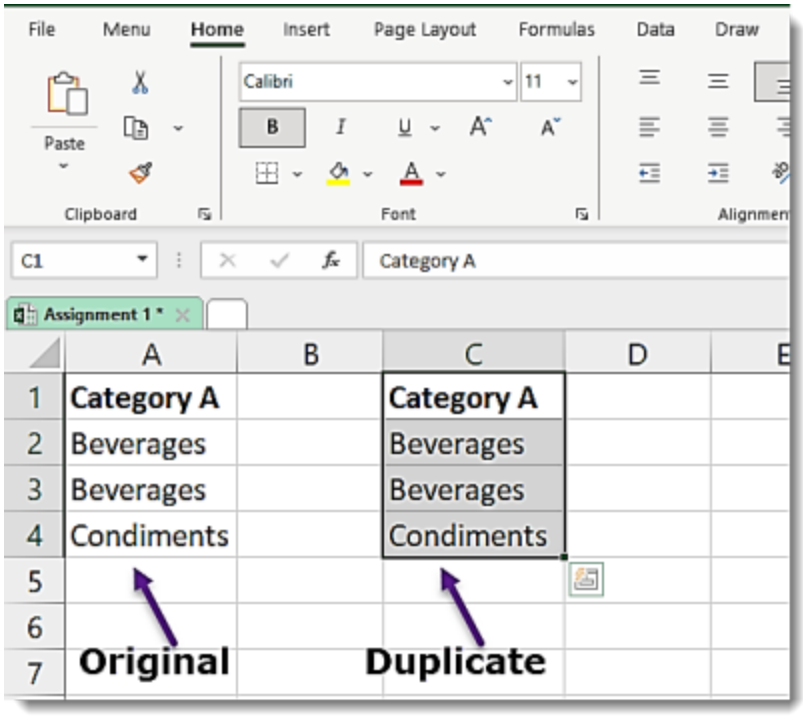


Alternatively, on your keyboard, press **Ctrl+X** to **cut** or **Ctrl+C** to **copy** the data selected. The difference between copy and cut is that the original data remains in its location when you **copy**, while the **cut** command removes the data from its original location after you must have **Paste** the data.

If you want to paste the data into an Excel worksheet, you can use the **Paste** command on the **Home** tab of the excel ribbon.



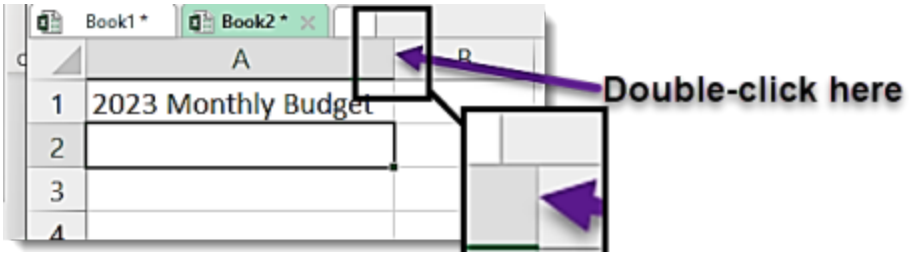
Or use the keyboard shortcut **Ctrl**+**V**.


File
Menu
Home
Insert
Page Layout
Formulas
Data
Draw
Paste
Calibri
11
B
Clipboard
Font
C1
Category A
Assignment 1 *
A
B
C
D
1
Category A
Category A
2
Beverages
Beverages
3
Beverages
Beverages
4
Condiments
Condiments
5
6
7
Original
Duplicate

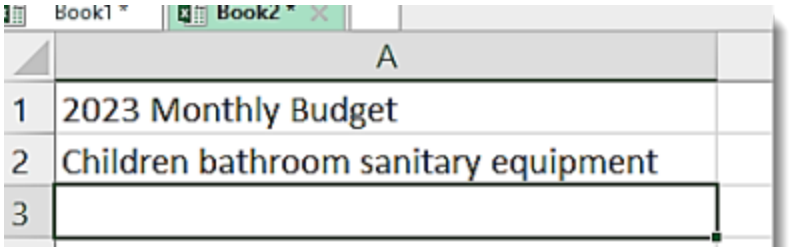
AUTOFIT COLUMN AND ROW

The AutoFit method requires a single click on the command to fit the column width or row height automatically.

Take your cursor to the edge of the column or row header line and double-click.



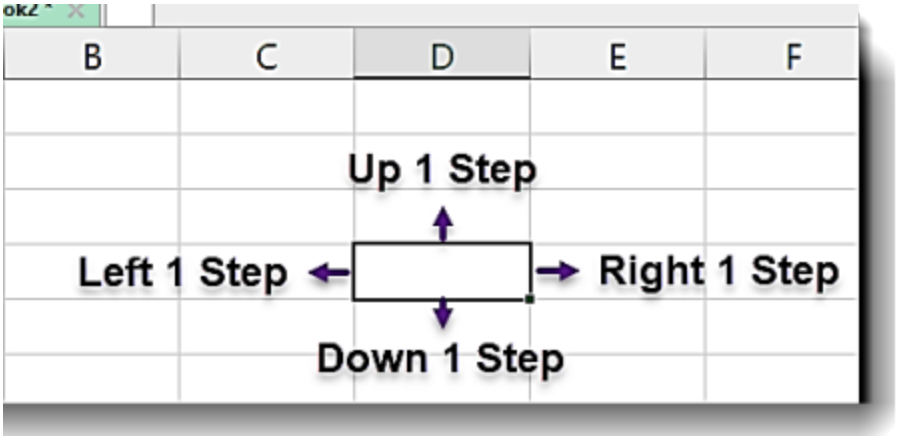
Excel will automatically adjust the column or row to fit all the content.



AutoFit is a fast method to fit your cell contents within a row or column.

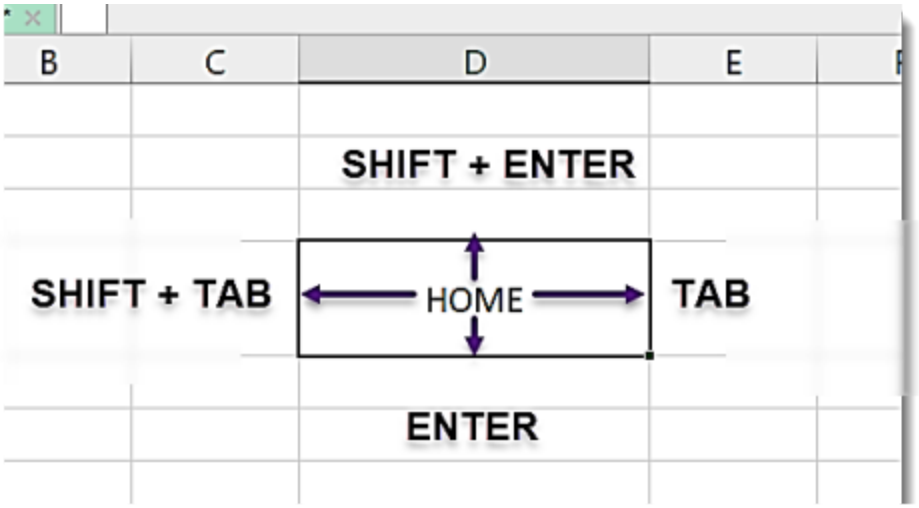
KEYBOARD NAVIGATION WITHIN A WORKSHEET

When using your mouse to input data, clicking on each cell to move across rows and columns can become cumbersome, especially when working with large amounts of data in a worksheet.



Generally, when navigating within a worksheet, you move either one step in one of the four directions or continue in the same direction. After moving away from an active cell, you do not necessarily have to use the mouse continuously to move in any other direction.

Use the keyboard key(s) as illustrated below for every one-step movement from the active cell.



To remain in the same cell after entering your data, press the **Ctrl** + **Enter** key.

If you are entering data within a column, press the **Enter** key to move one step downwards.

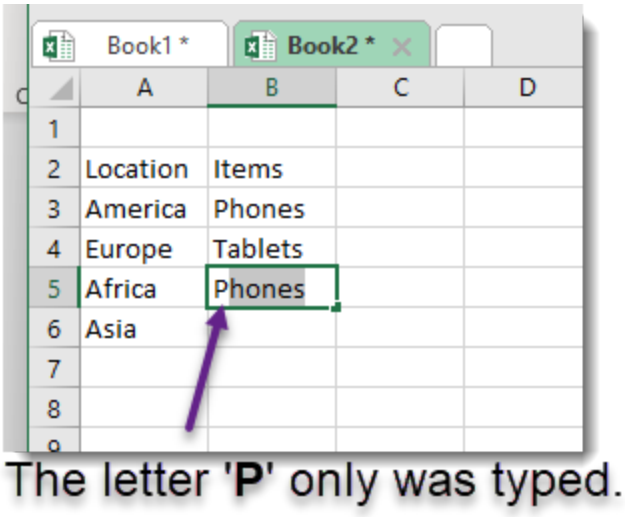
If you are entering data within a row, press the **Tab** key to move one step to the right.

AUTOCOMPLETE DATA ENTRY

When using AutoComplete, you only need to type the first few letters of a text entry into a cell before Excel fills in the rest of the text based on previous entries.

For example, if you have a list of items to be sent to different locations, a particular item might be going to several locations.

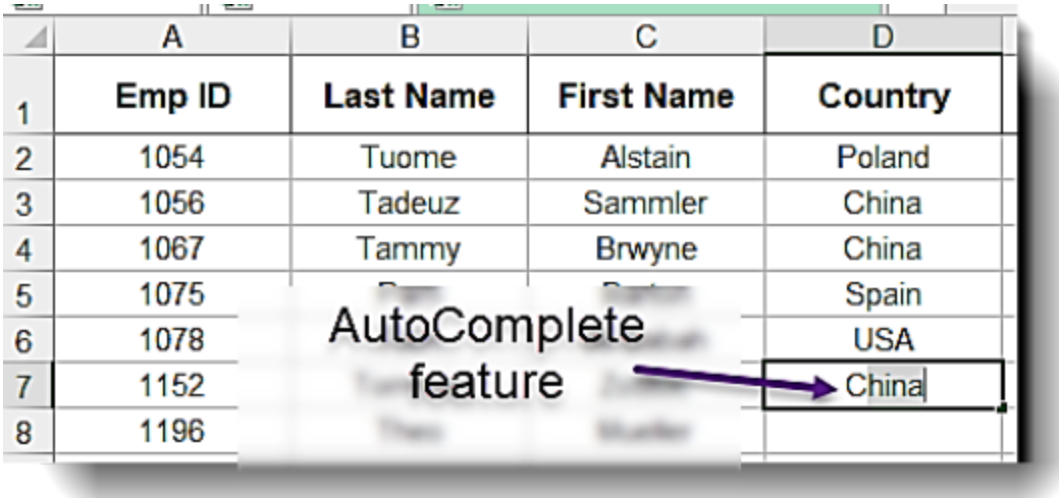
So with Autocomplete, data for the item will be filled once you enter the first few letters and press the **Enter** key.



Once you type the letter **'P'**, the remaining text (**hones**) is filled with Autocomplete and entered when you press the **Enter** key.

Excel looks at the previous entries in column **B** and tries to inform you **if** you are trying to enter **Phones** because it already sees **Phones** in this column.

AutoComplete is a great tool when entering information where you have duplicate entries, often repeating in the same column.



	A	B	C	D
1	**Emp ID**	**Last Name**	**First Name**	**Country**
2	1054	Tuome	Alstain	Poland
3	1056	Tadeuz	Sammler	China
4	1067	Tammy	Brwyne	China
5	1075	[illegible]	[illegible]	Spain
6	1078	[illegible]	[illegible]	USA
7	1152	[illegible]	[illegible]	China
8	1196	[illegible]	[illegible]	

AutoComplete helps in keeping your Data clean and error-free.

Be careful when using AutoComplete suggestions, or you might mistakenly accept a text by pressing the **Enter** key.

For example, if you want to enter the word **Chile**, you might mistakenly enter **China** by using the Autocomplete feature.

	A	B	C	D
1	**Emp ID**	**Last Name**	**First Name**	**Country**
2	1054	Tuome	Alstain	Poland
3	1056	Tadeuz	Sammler	China
4	1067	Tammy	Brwyne	China
5	1075	Pam	Barton	Spain
6	1078	Tom	Al-Sabah	USA
7	1152	Tommie	Zostoc	Chile
8	1196	Theo	Mueller	

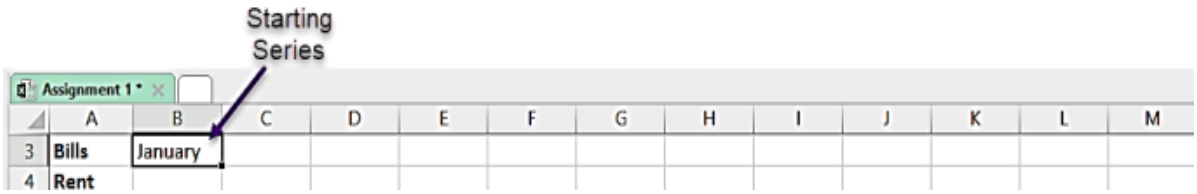
Notice the words China in cell **D3** and Chile both have **Chi** at the beginning.

AUTOFILL SEQUENCE DATA ENTRY

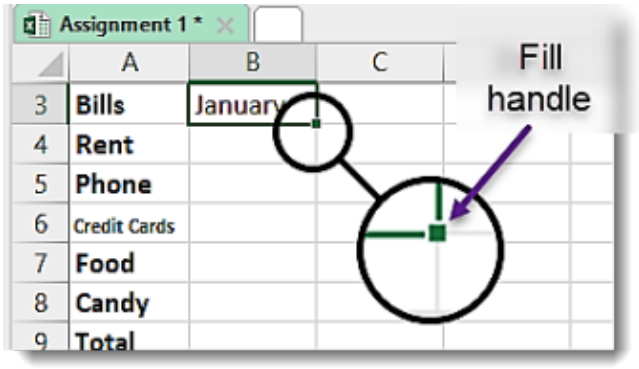
AutoFill is a feature in Excel that allows you to quickly fill a range of blank cells with a series of values or a formula at the click of a button.

The process of using AutoFill is pretty straightforward. All you have to do is ensure the cell or range of cells where you wish to fill the data is ready.

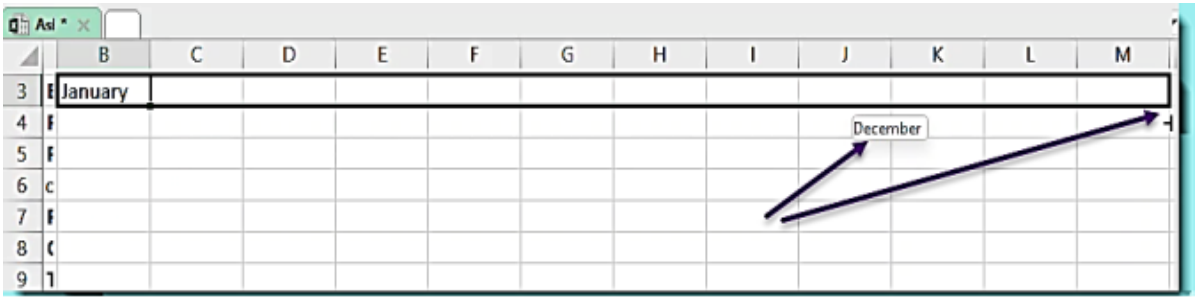
Type the value or formula you wish to use as the starting point for the series, so as illustrated below; the starting value is in cell **B3**.



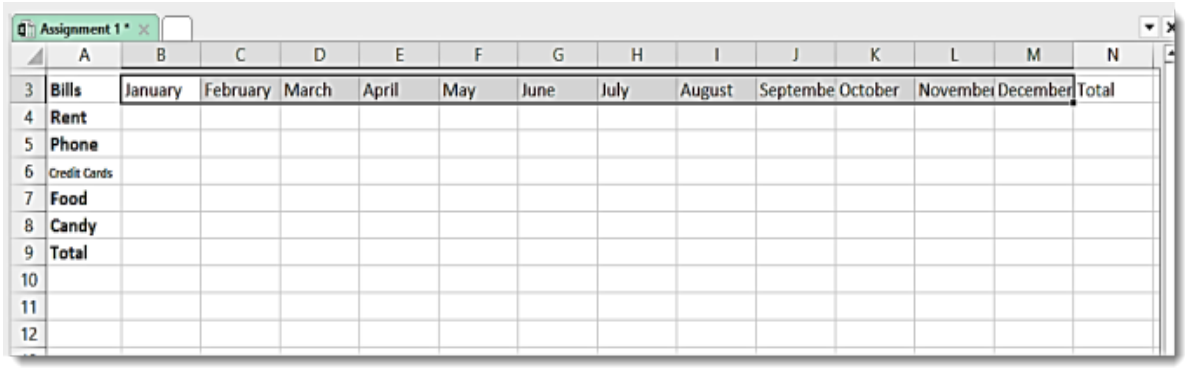
Next, you drag the fill handle (in the bottom-right corner of the selected cell or range) to the cells you wish to fill.



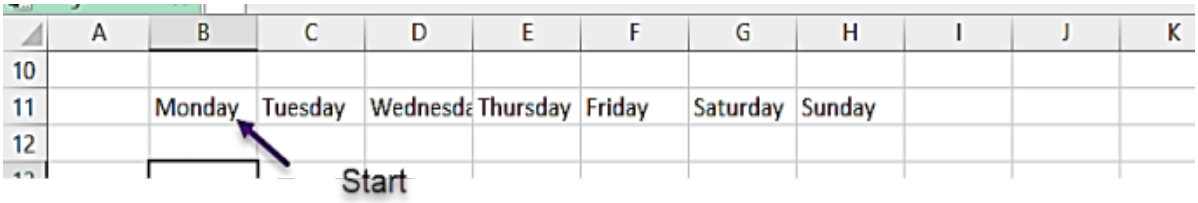
Upon dragging and pulling the fill handle **towards your right**, a preview of the filled cells will be displayed.



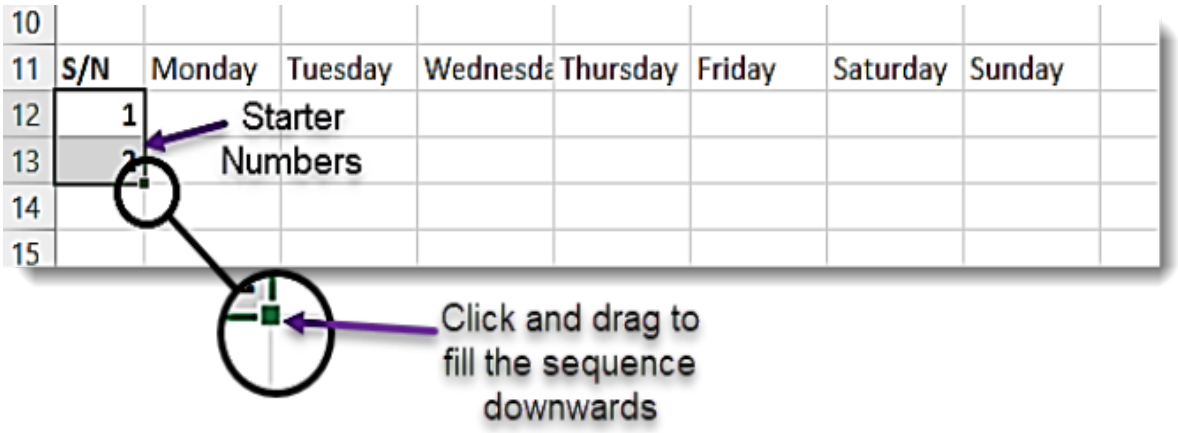
The series will appear in the cells as soon as you release the mouse button.

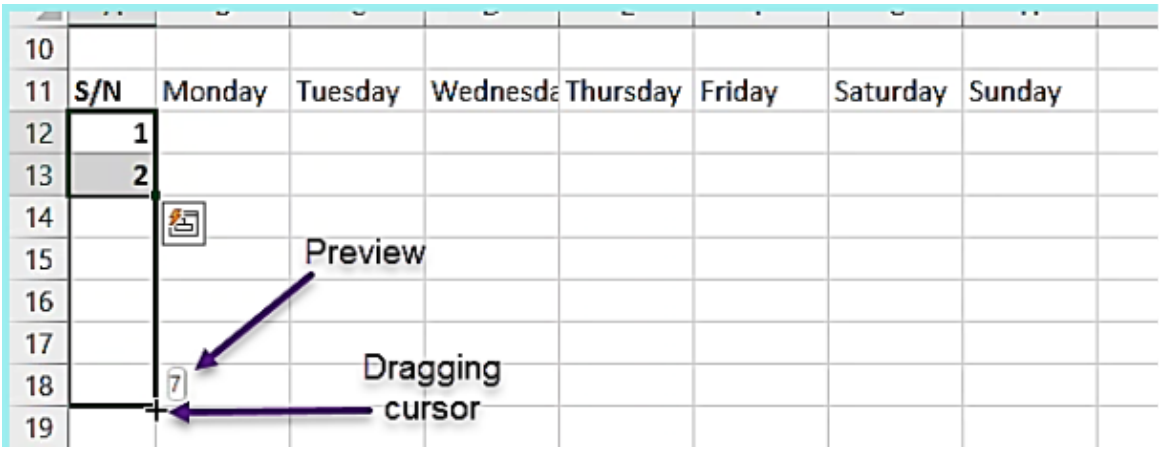


Autofill can be utilized to rapidly fill in your worksheet with both the days of the week and all the months of the year.

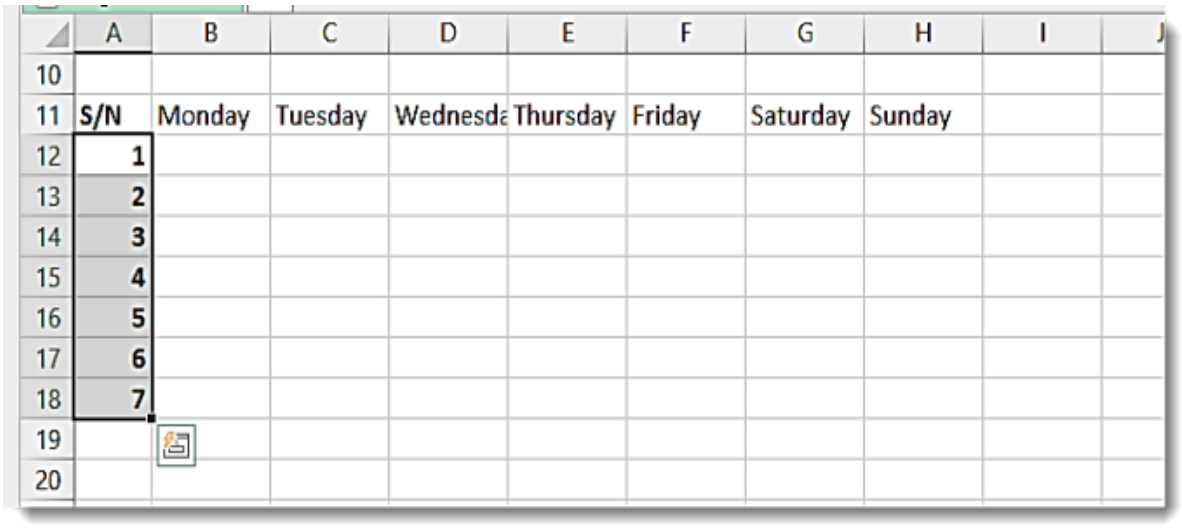


To use the AutoFill sequence to enter **numerals**, type the first two numbers, then highlight both cells.

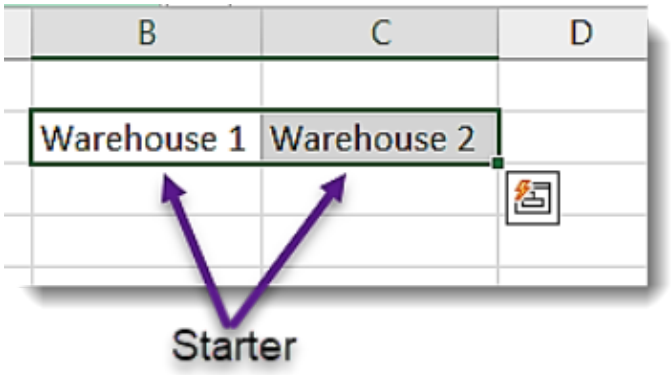




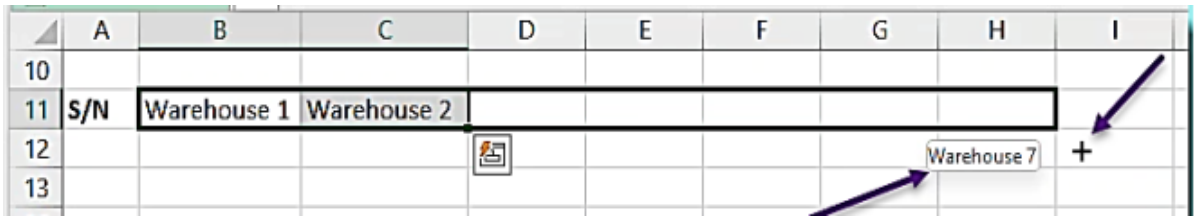
The preview gives you an idea of the data that will appear in each cell. The dragging cursor indicates the position of the mouse cursor. Once you release the mouse button, the cells get filled automatically.



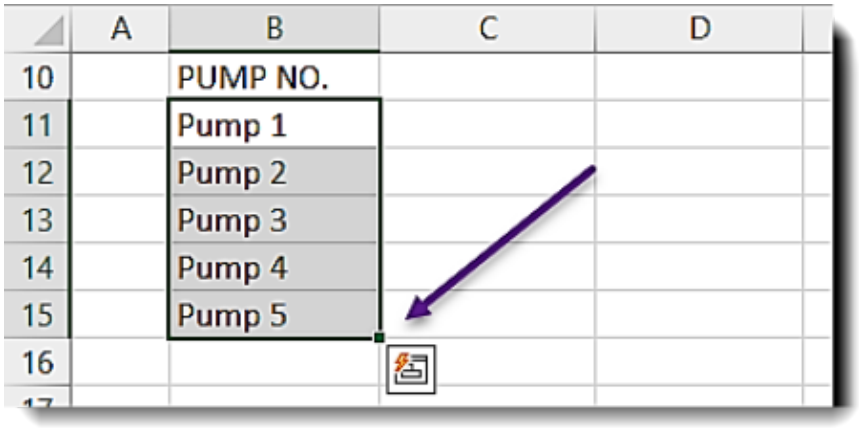
You will need to enter data in the first two cells for a combination of Text and Numerals.



Next, click and drag the fill handle to Autofill the sequence along the path after releasing the mouse button.

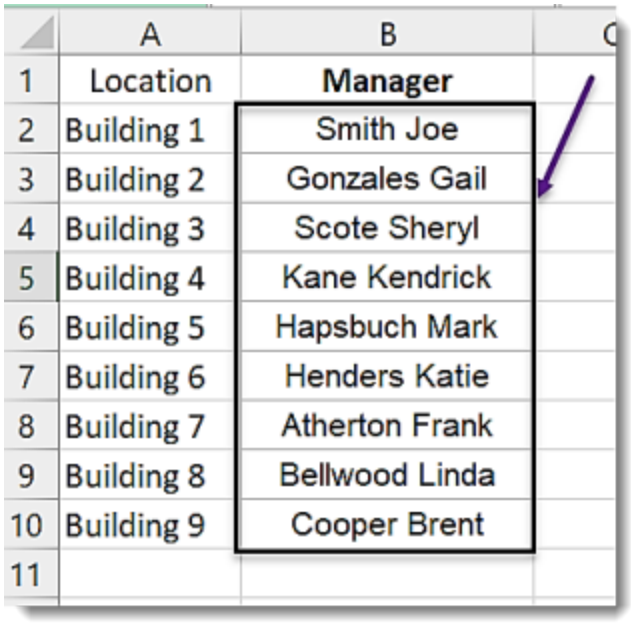


	A	B	C	D	E	F	G	H	I	J
10										
11	**S/N**	Warehouse 1	Warehouse 2	Warehouse 3	Warehouse 4	Warehouse 5	Warehouse 6	Warehouse 7	Warehouse 8	
12										
13										
14										



HOW TO CREATE A CUSTOM AUTOFILL SEQUENCE

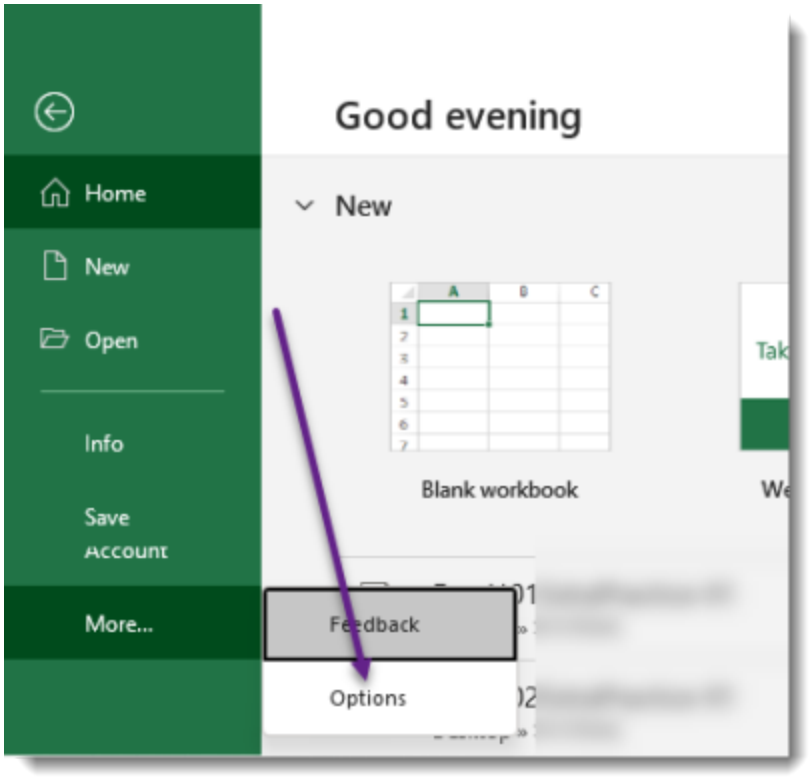
You can create a custom list to enter data like the Autofill sequence. If you have a list of products or employees in your department, it would be better to add them to a custom list



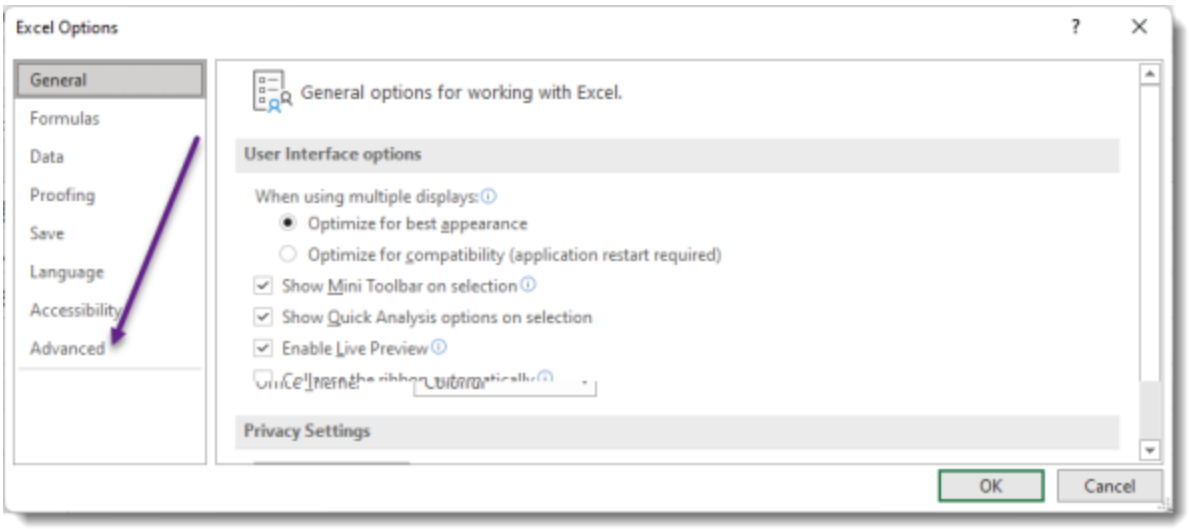
	A	B
1	Location	**Manager**
2	Building 1	Smith Joe
3	Building 2	Gonzales Gail
4	Building 3	Scote Sheryl
5	Building 4	Kane Kendrick
6	Building 5	Hapsbuch Mark
7	Building 6	Henders Katie
8	Building 7	Atherton Frank
9	Building 8	Bellwood Linda
10	Building 9	Cooper Brent
11		

Rather than continually typing the list of products or staff in your department one after the other in a column or row when necessary, you simply Autofill them in a sequence.

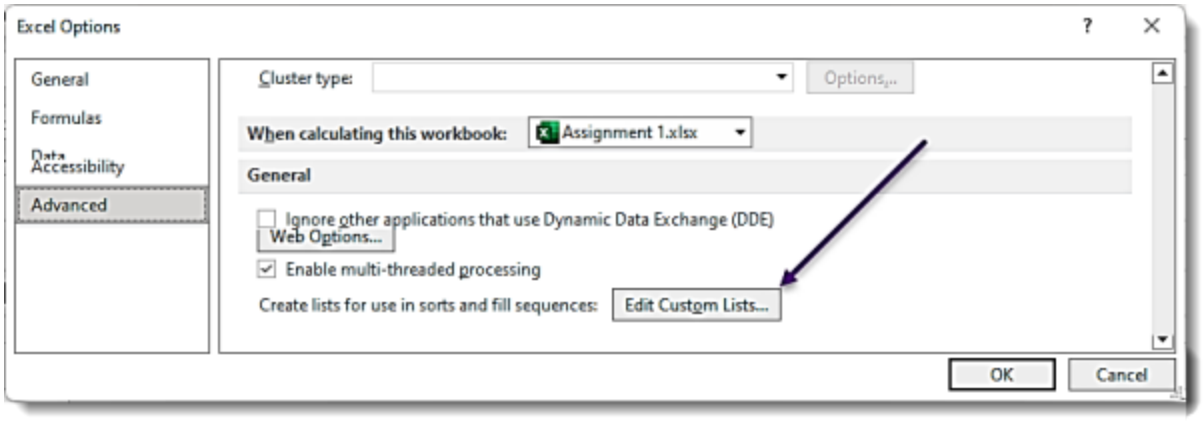
Go to the **File** menu, scroll down, and click on **Options** to open the **Excel Options** dialog box**.**



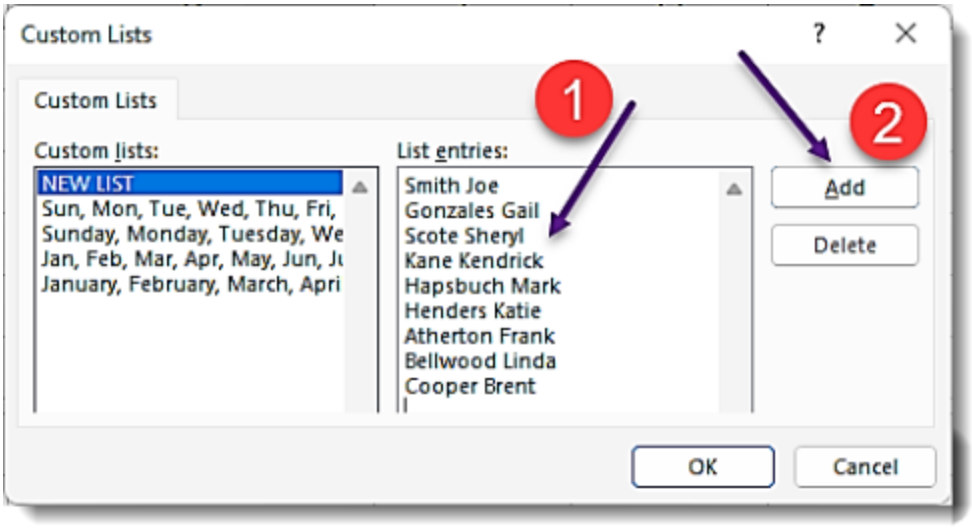
On the **Excel Options** dialog box, click on **Advanced**.



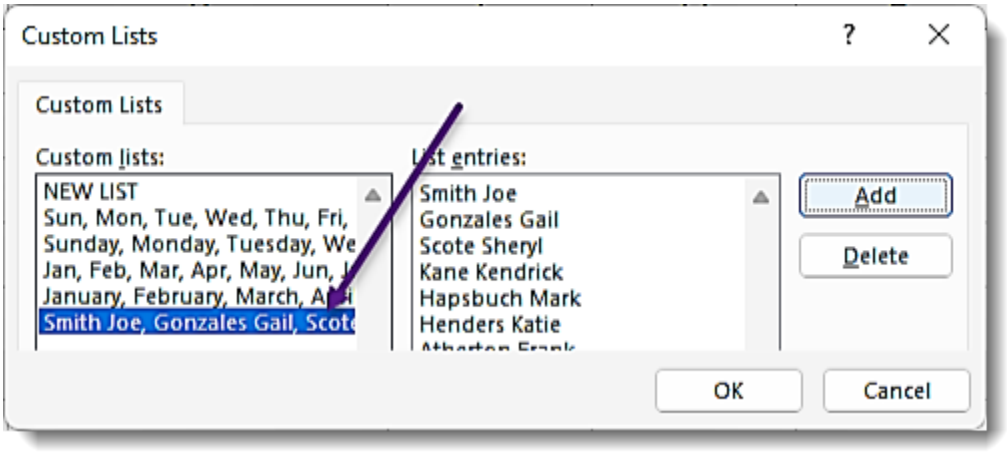
Next, scroll down and click on the **Edit Custom Lists** button.



On the **Custom Lists** dialog box, enter the data (name of managers) in the **List Entries** space and click on the **Add** button.

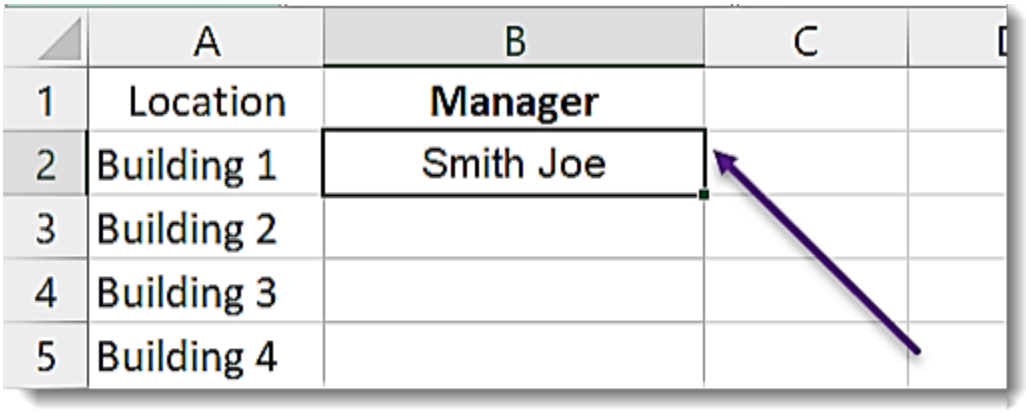


The new list will appear in the **Custom Lists,** as shown below.

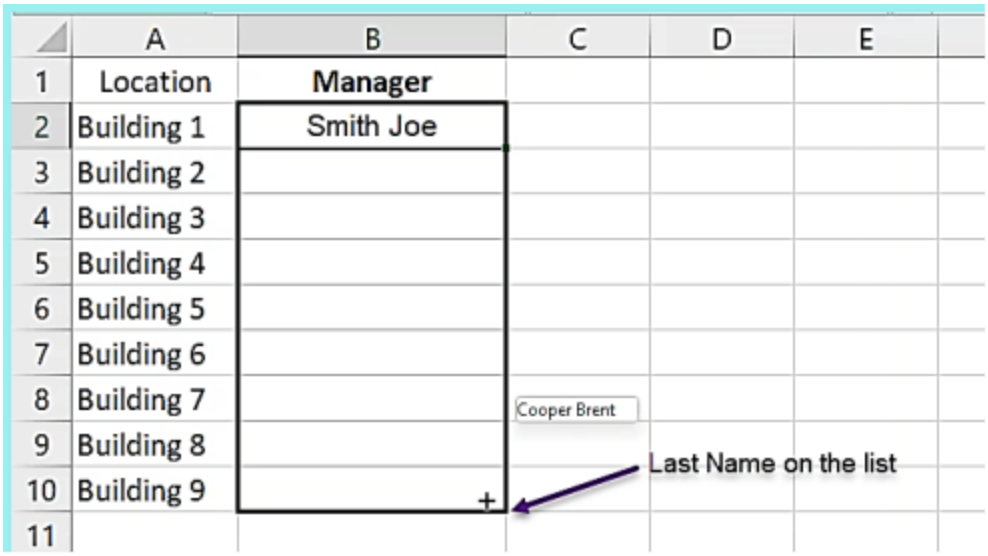


Click the **OK** button to complete the process.

Go to the worksheet and enter the first name in the starting cell.



Click on the AutoFill handle and drag it to the last cell.



This method helps you to enter data quickly into your worksheet, especially if dealing with big data.

EXERCISE

Recreate the table below in an excel worksheet and save it as **Assignment 1.**

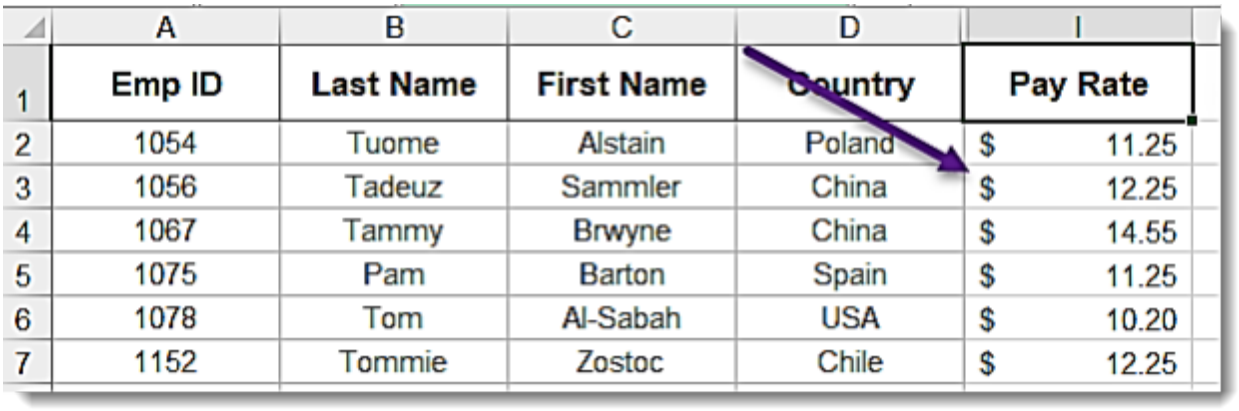
Monthly Budget													
Bills	January	February	March	April	May	June	July	August	Septembe	October	November	December	Total
Rent	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	
Phone	200	250	220	200	210	200	200	230	230	240	250	300	
Credit Car	200	150	200	200	230	120	300	203	203	220	230	250	
Food	250	230	240	244	245	250	290	300	350	305	345	400	
Candy	140	150	124	150	143	135	134	150	150	140	150	200	
Total													

LESSON 4

CELL FORMATTING

Excel uses the same formatting for all cell content by default, which makes it hard to read a worksheet with a lot of data. You can personalize a workbook using basic formatting methods on a particular section of your worksheet, making it easier to read and comprehend data.

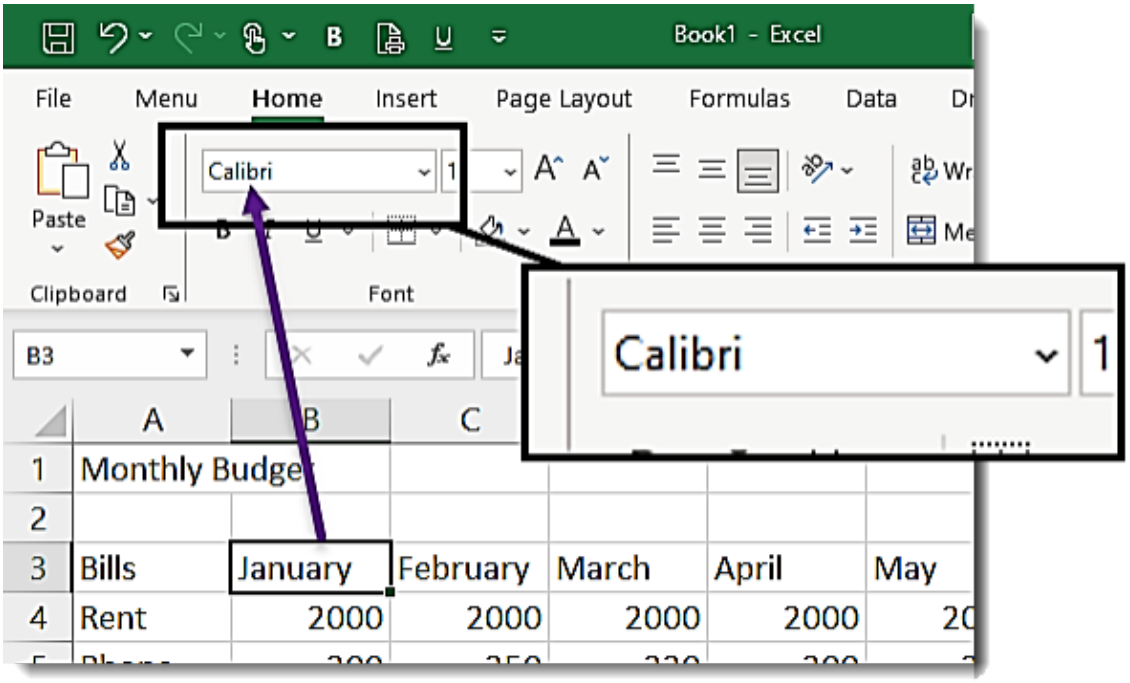
Column(s) or row(s) on your worksheet can be formatted to display data in a format such as percentages (%), currency ($), time, date, etc.



	A	B	C	D	I
1	**Emp ID**	**Last Name**	**First Name**	**Country**	**Pay Rate**
2	1054	Tuome	Alstain	Poland	$ 11.25
3	1056	Tadeuz	Sammler	China	$ 12.25
4	1067	Tammy	Brwyne	China	$ 14.55
5	1075	Pam	Barton	Spain	$ 11.25
6	1078	Tom	Al-Sabah	USA	$ 10.20
7	1152	Tommie	Zostoc	Chile	$ 12.25

CHANGING FONT TYPE

Calibri is the default font in an Excel workbook.



Under the **Font** group within the **Home** tab, you can find the **Font** command. By selecting a cell, you can view the currently applied **Font Type**. Excel provides a wide range of fonts to modify the appearance of your cell text. The most effective method to become proficient in workbook formatting techniques is to gain experience by utilizing the formatting features available in Excel.

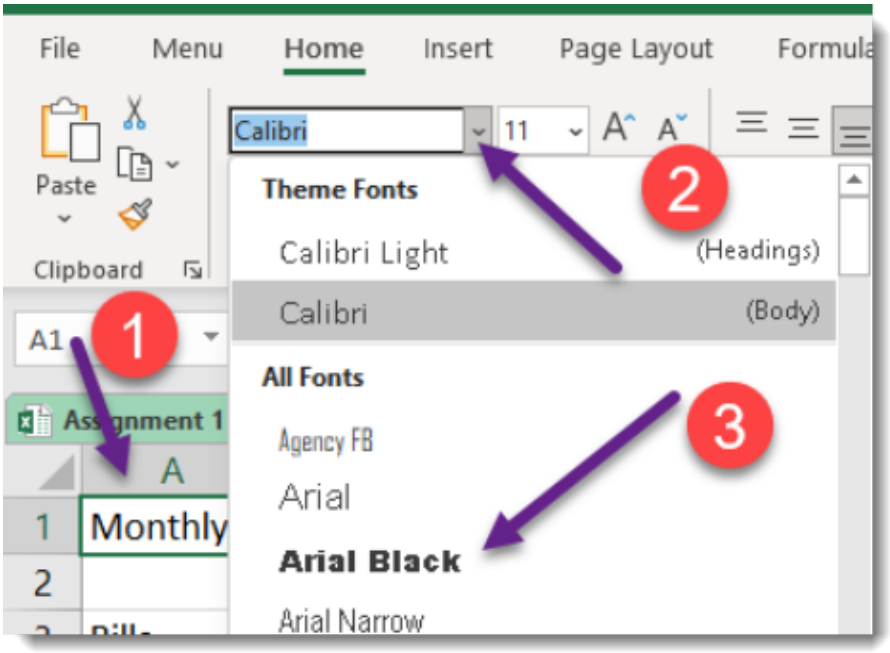
Use the illustration below to practice **Basic Formatting** techniques.

Remember we are using the workbook saved as **Assignment 1,** have yours open on your computer and follow up.

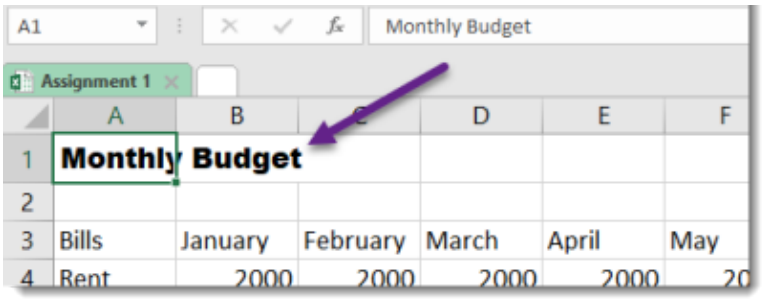
Monthly Budget												
Bills	January	February	March	April	May	June	July	August	Septembe	October	November	December	Total
Rent	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	
Phone	200	250	220	200	210	200	200	230	230	240	250	300	
Credit Car	200	150	200	200	230	120	300	203	203	220	230	250	
Food	250	230	240	244	245	250	290	300	350	305	345	400	
Candy	140	150	124	150	143	135	134	150	150	140	150	200	
Total													

Now, Change the font in cell **A1** to Arial Black.

Click the drop-down **arrow** and select **Arial black** from the drop-down list.



Cell **A1,** is now wearing a new font called Arial back.

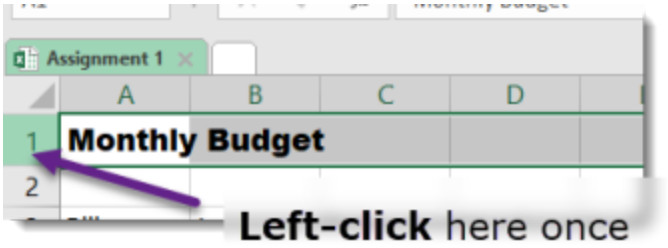


It is advisable to utilize fonts that are either easy to read or aesthetically pleasing when working with a worksheet. Some recommended font options include Calibri, Cambria, Times New Roman, and Arial.

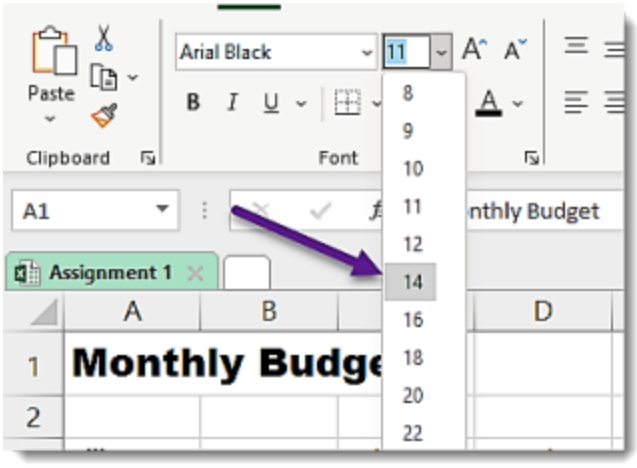
CHANGE FONT SIZE

Modifying the font size of your cell content is possible, allowing you to display text that is either larger or smaller than the default font size of 11 in an Excel workbook. The font size command can be found in the **Font** group under the **Home** tab. To adjust the font size for cells on row 1 in the **'Assignment 1'** workbook, select the **Font** size command and click on the dropdown arrow. Then, choose **14** as the new font size.

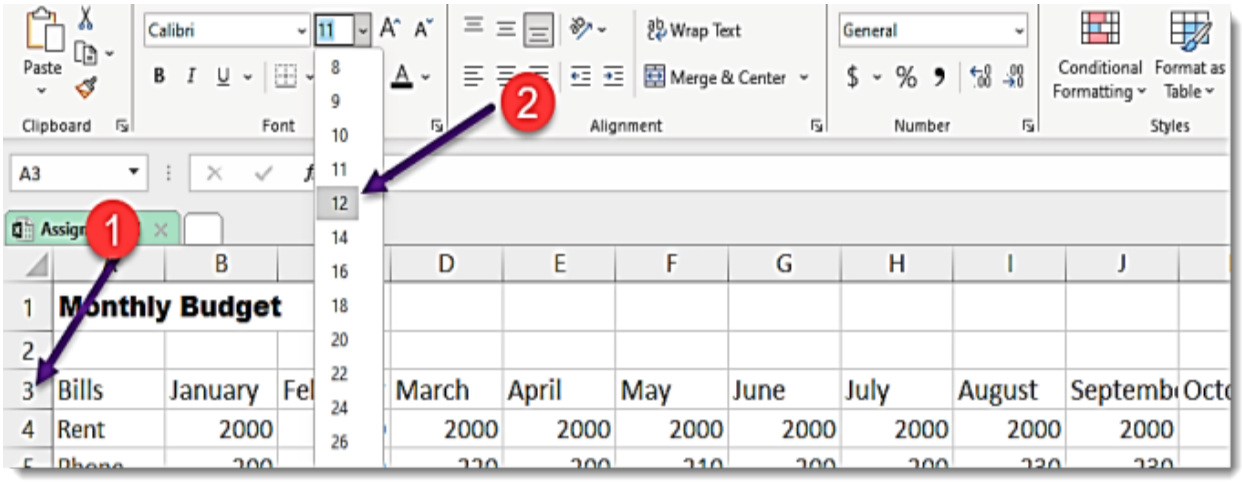
Highlight row 1 with a single click on the row header.



Next, change the font size to 14.



Next, click on row 3 and then change the font size to 12.



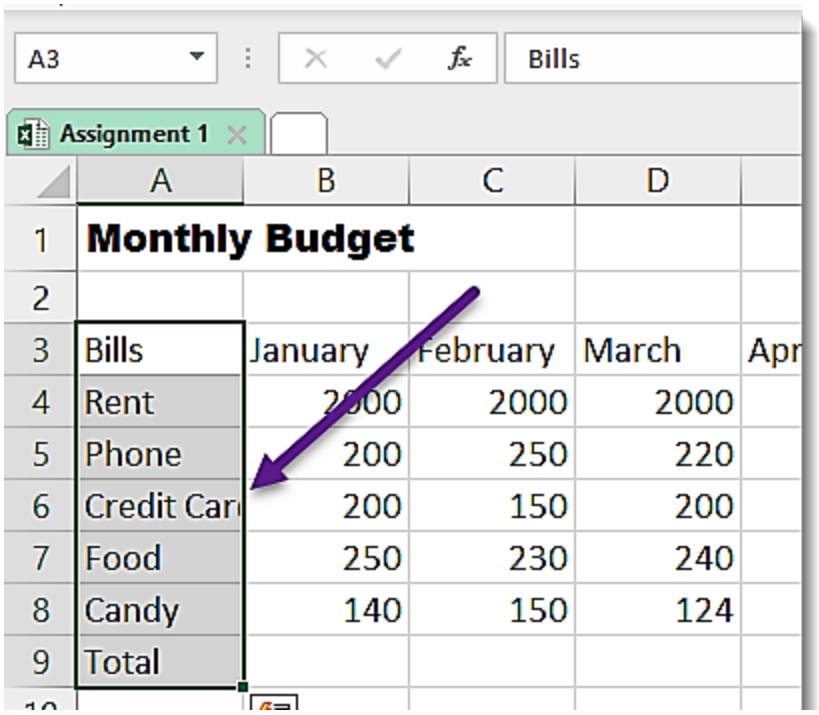
So far, you have learned how to change a font in your worksheet and increase the font size.

Remember you either increase or decrease font size using the same drop-down arrow in the font group under the **Home** tab.

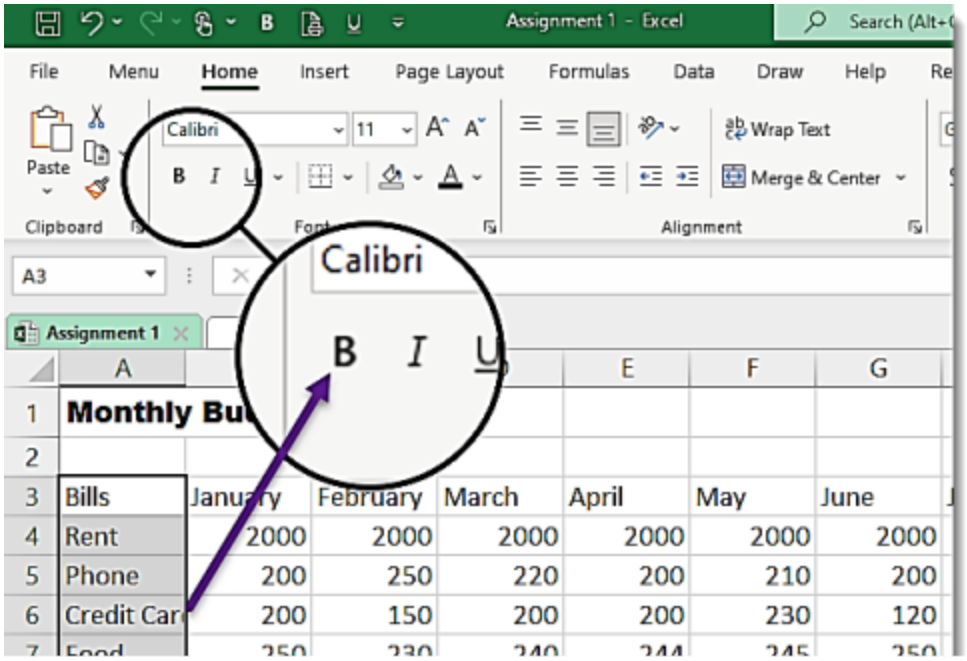
BOLDFACING AND UNDERLING

To boldface the content of a cell in Excel, you use the **Bold** formatting option in the **Font** group under the **Home** tab.

Go to the '**Assignment 1'** workbook, and select the cells in column **A.**



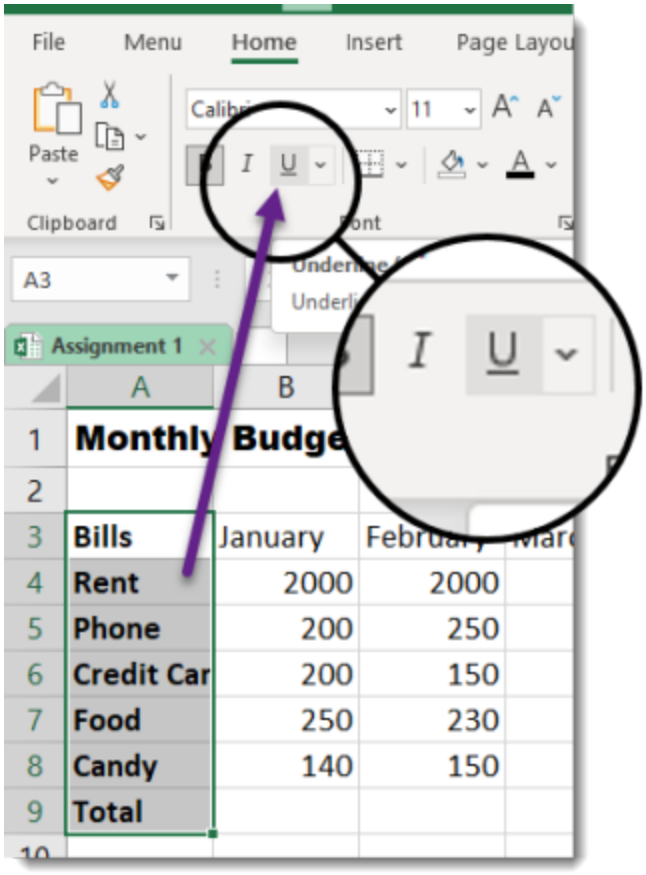
Next, go to the **Home** tab, and click the "**B**" icon in the Font group.



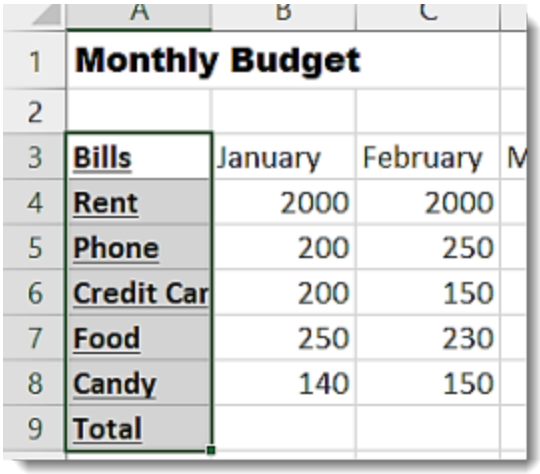
The keyboard shortcut to Bold a text in Excel is **Ctrl** + **B**.

To underline the content of a cell in Excel, you follow the same method as that of **boldfacing**, but this time you click on the "**U**" icon on the Font group.

Select the cells in column **A** and then click on the '**U**'.

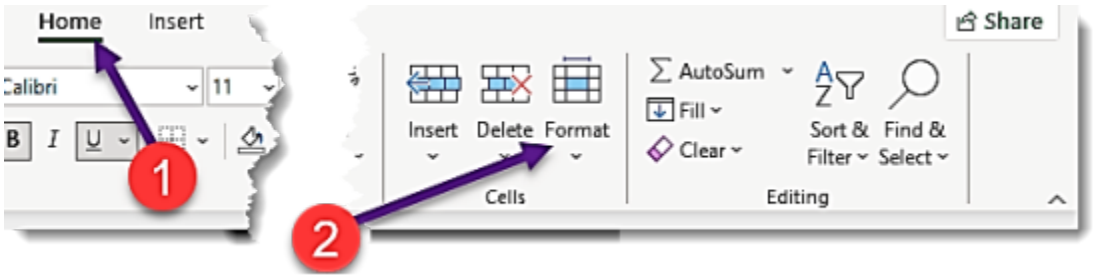


The keyboard shortcut is Ctrl+U.

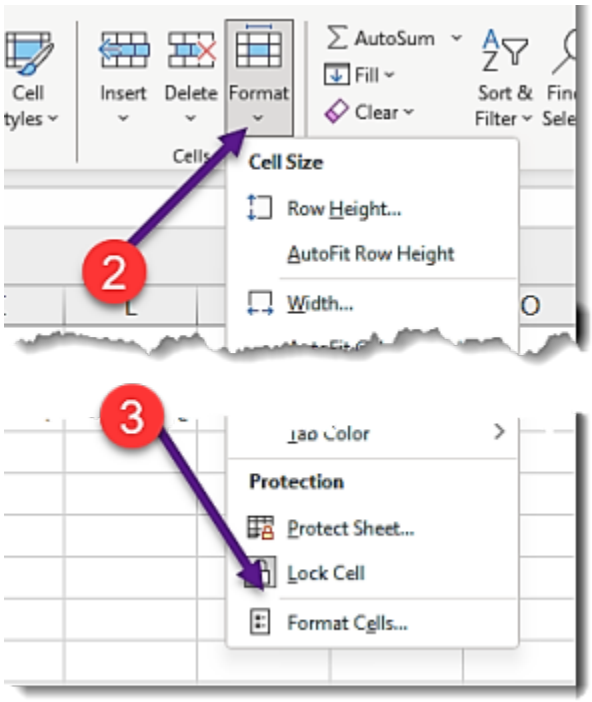


Additionally, you can use the Format Cells dialog box to apply **Bold** and **Underline** formatting to your cell content.

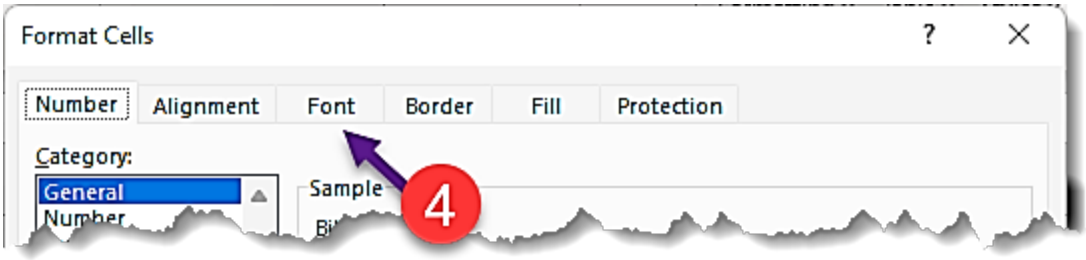
To do this, select the cells you want to format, go to the **Home** tab, and click the "**Format**" drop-down in the Cells group.



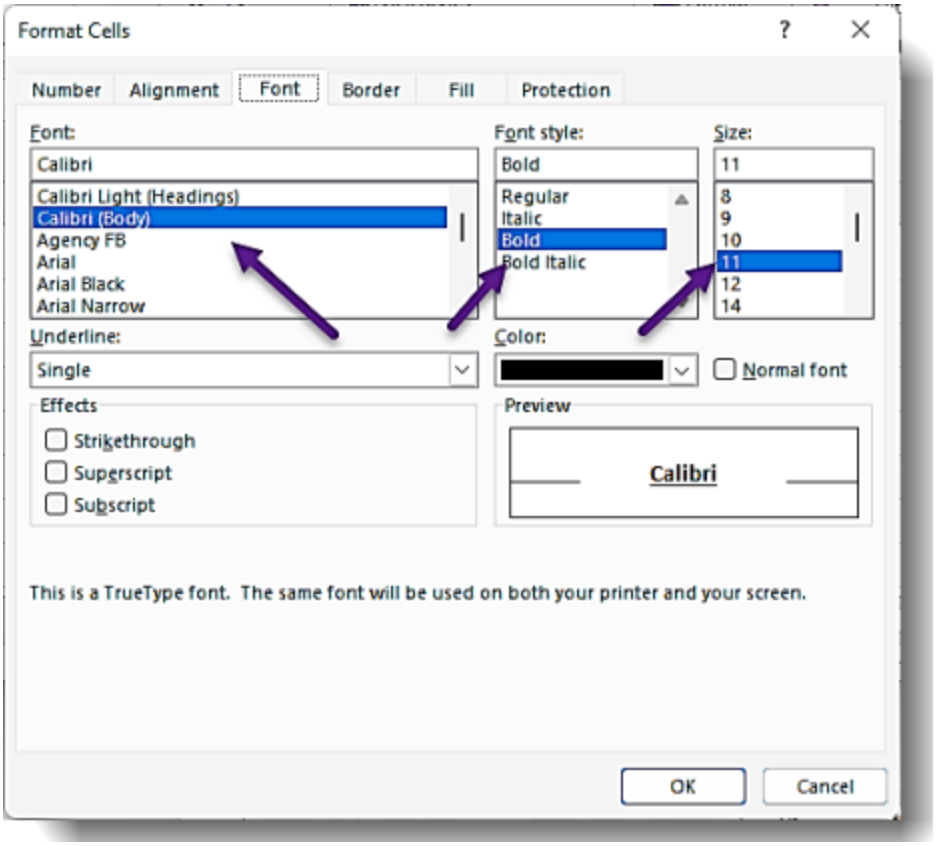
From the drop-down list, select "**Format Cells**".



In the **Format Cells** dialog box, select the "**Font**" tab.

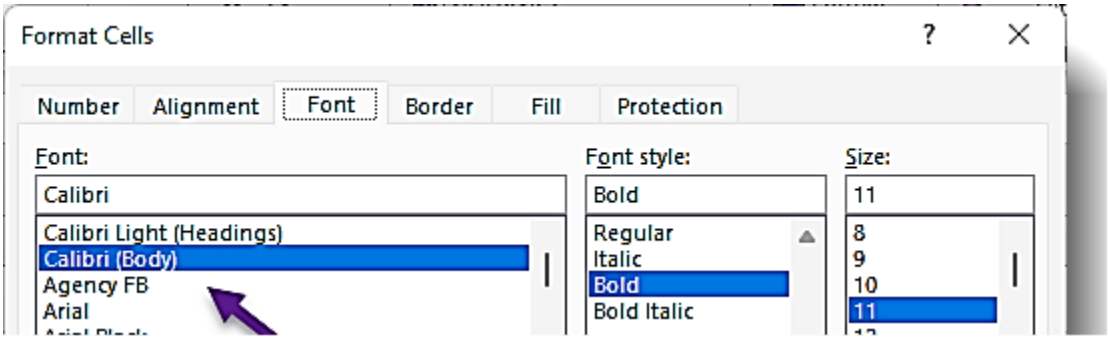


Next, select the Bold and/or Underline options you desire.



Click on the "**OK**" button to apply the formatting to your selected cells.

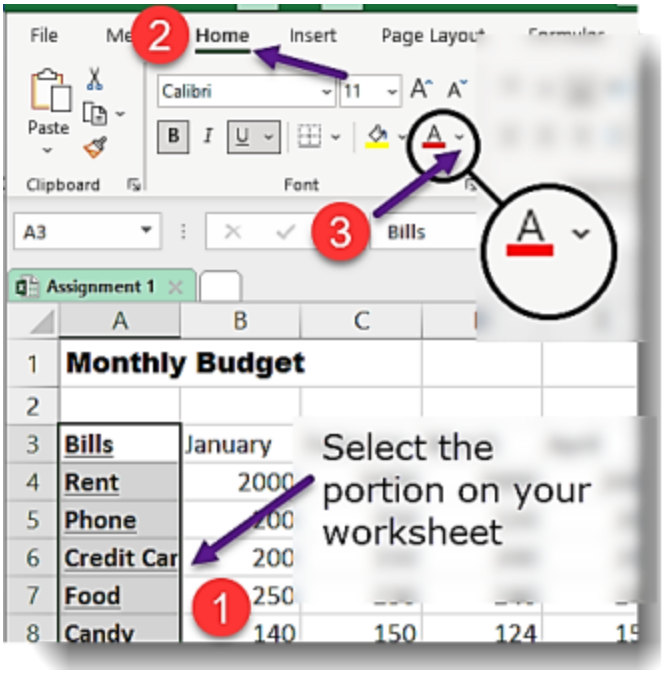
Also, know that the **Font** tab on the **Format Cells dialog box** also allows you to change the font type in an entire worksheet.


Format Cells
Number
Alignment
Font
Border
Fill
Protection
Font:
Calibri
Calibri Light (Headings)
Calibri (Body)
Agency FB
Arial
Font style:
Bold
Regular
Italic
Bold
Bold Italic
Size:
11
8
9
10
11

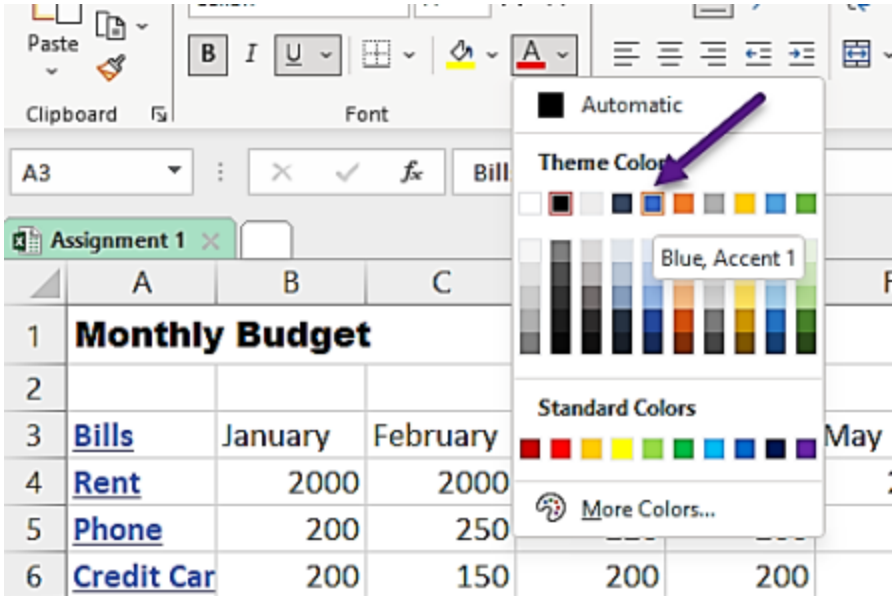
CHANGING FONT COLOR

The default **Font color** in Excel is **black**, and you can change the font by following these steps:

- Open the '**Assignment 1**' workbook and select the cell with data in column A.
- Go to the **Home** tab, move to the font group, and click on the drop-down arrow beside the Font color command with an '**A**' icon, as illustrated below.

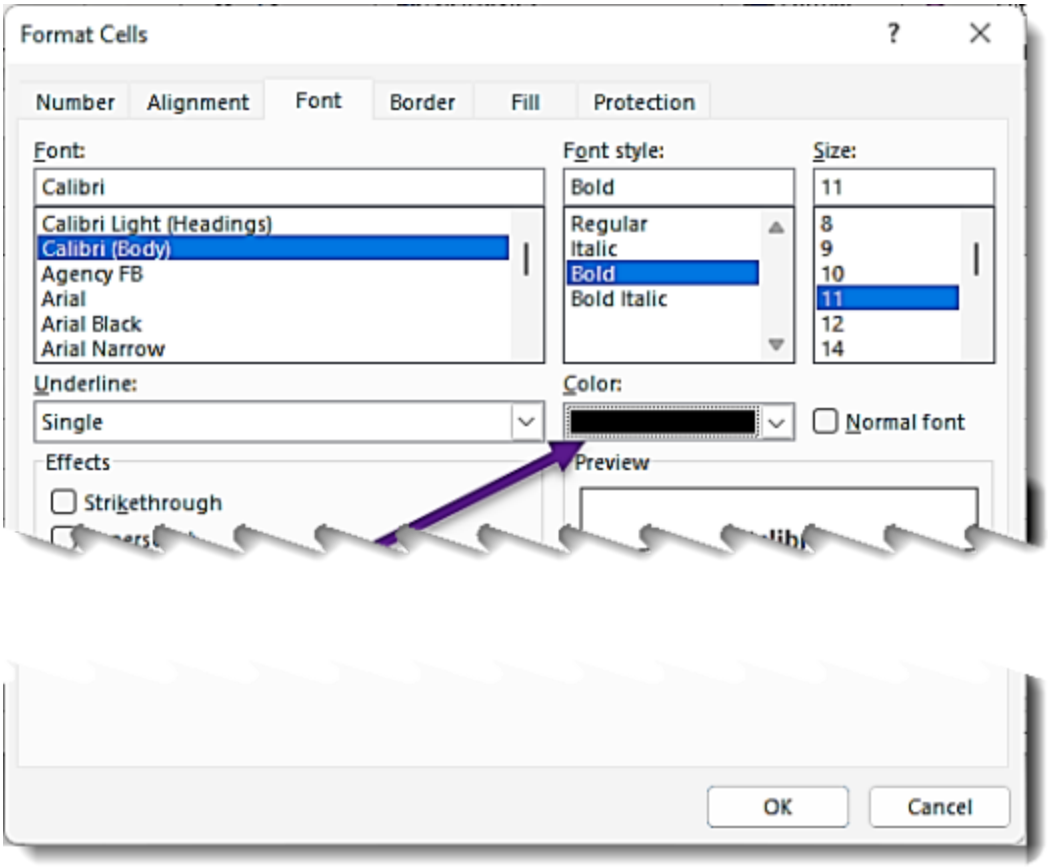


- Select the color of your choice.



- The font color of the cells you selected changes immediately.

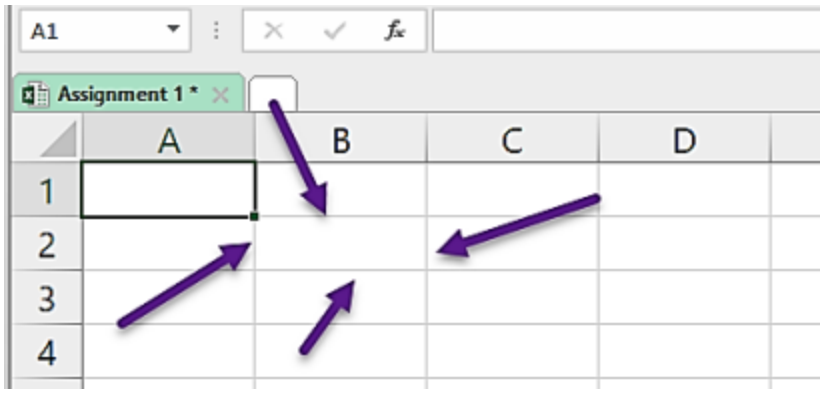
Alternatively, as discussed earlier, you can also use the **Format cells dialog box** to change the font color of your selected cells, column, or row.



Always select the portion of your worksheet you want to apply changes to the font color, size, boldface, and underline.

ADDING BORDER

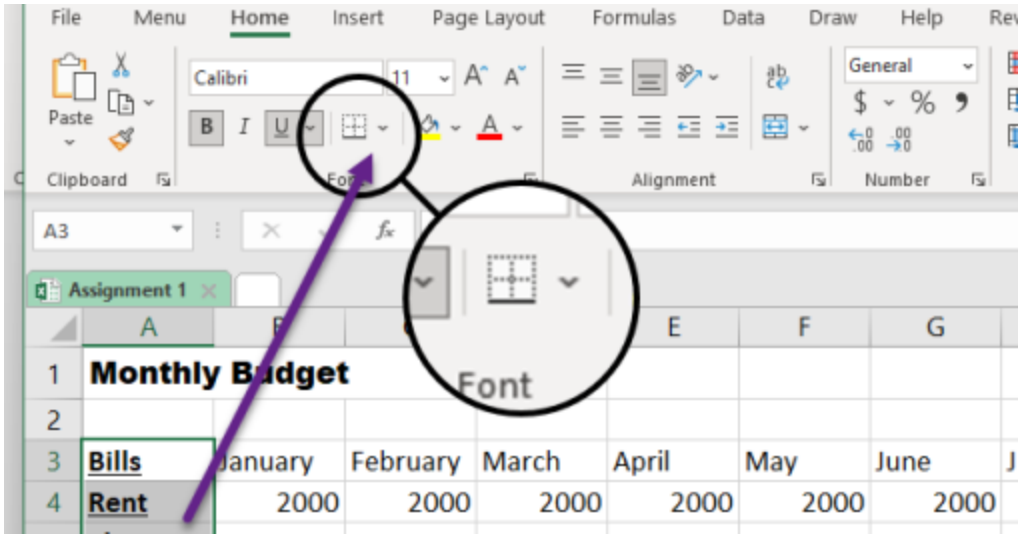
Gridlines surround each cell in a worksheet. These lines are not printable by default, which means they are there to guide you when entering data.



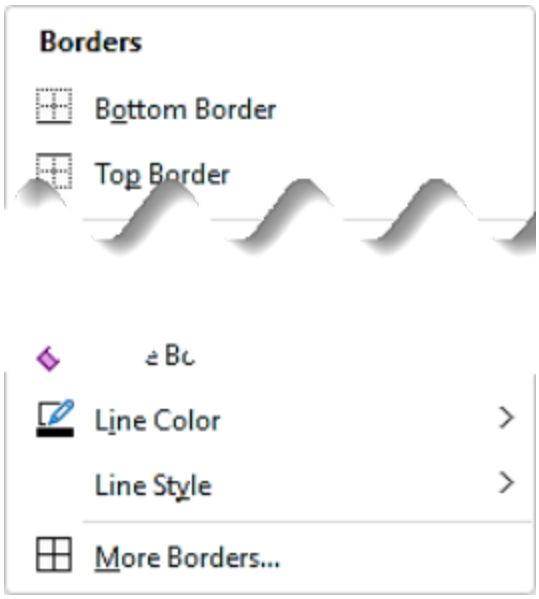
You will need to apply borders around your cell or range of cells to make them visible when you print.

Excel provides you with the option to frame a group of cells with vertical or horizontal lines, known as cell borders, for a variety of reasons such as emphasizing data, improving the spreadsheet's appearance, and organizing data for better viewing. Borders can be added to a single cell or a range of cells, with various types available, including solid, dashed, or double lines. Moreover, you can also modify the thickness and color of the border to enhance the visual appeal of your worksheet.

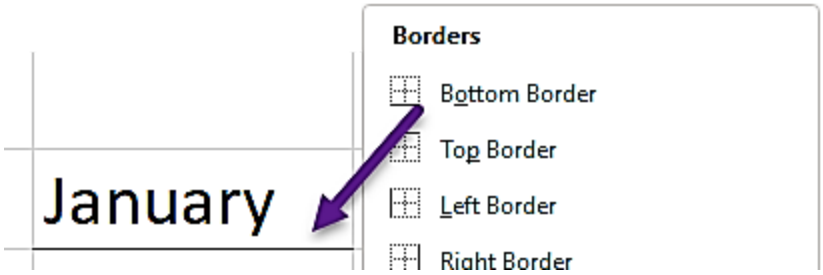
To add a border to a range of selected cells, go to the **Home** tab, move to the **Font group**, and click on the drop-down arrow beside the **Border** command icon, as illustrated below.



From the drop-down menu, you can then choose from several borderline styles to add to the selected cells.

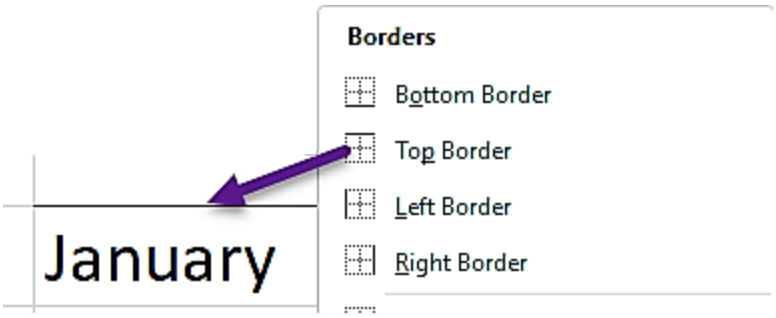


So, select cell **B3** in the **Assignment 1** workbook, and let us practice together.



The **Bottom Border** adds a thick line at the **bottom frame** of a cell **B3**.

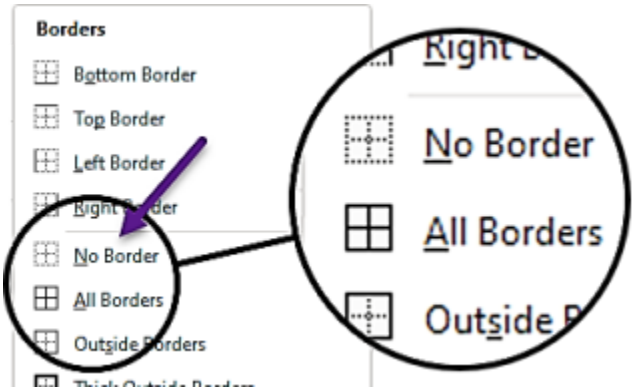
If you choose the **Top-Border**, you will have the thick line added at the top frame of the cell **B3**.



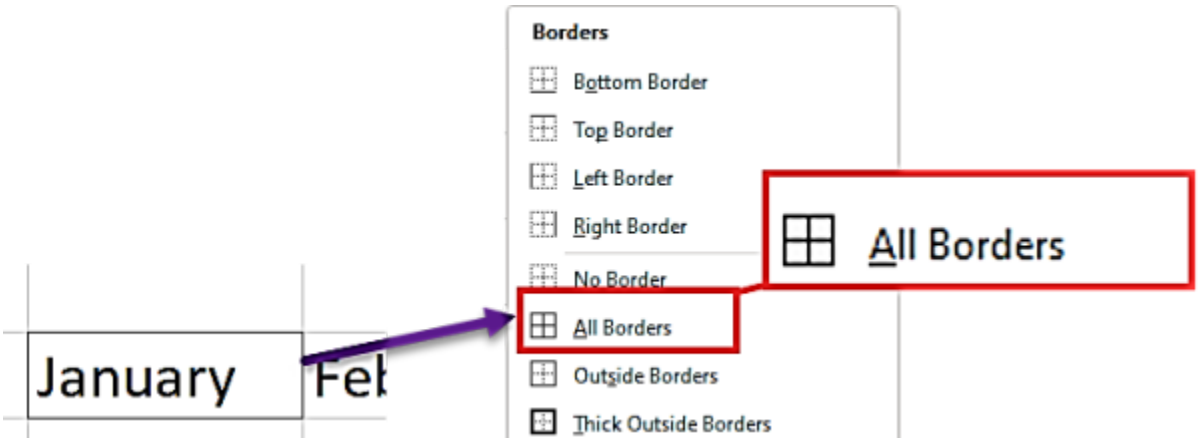
The same applies to the **Left** or **Right** Border.



The **No Border** option removes the entire border from the selected cell.

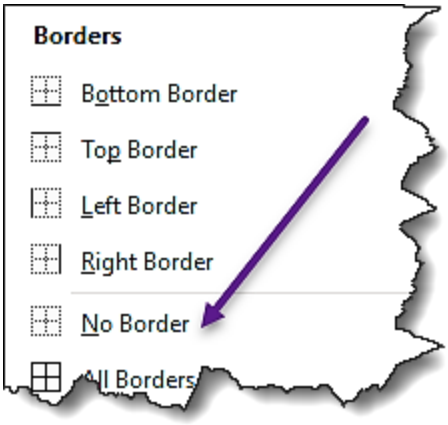


However, choose the **All Borders** if you want the border line to fully appear around the corners of a cell or range of cells already selected.



To gain a better understanding of how border styles function, I recommend you experiment with each of them from the drop-down menu.

Try applying a specific border style to a cell and then deselect it by selecting the **No Border** option, before repeating the process with a different border style.



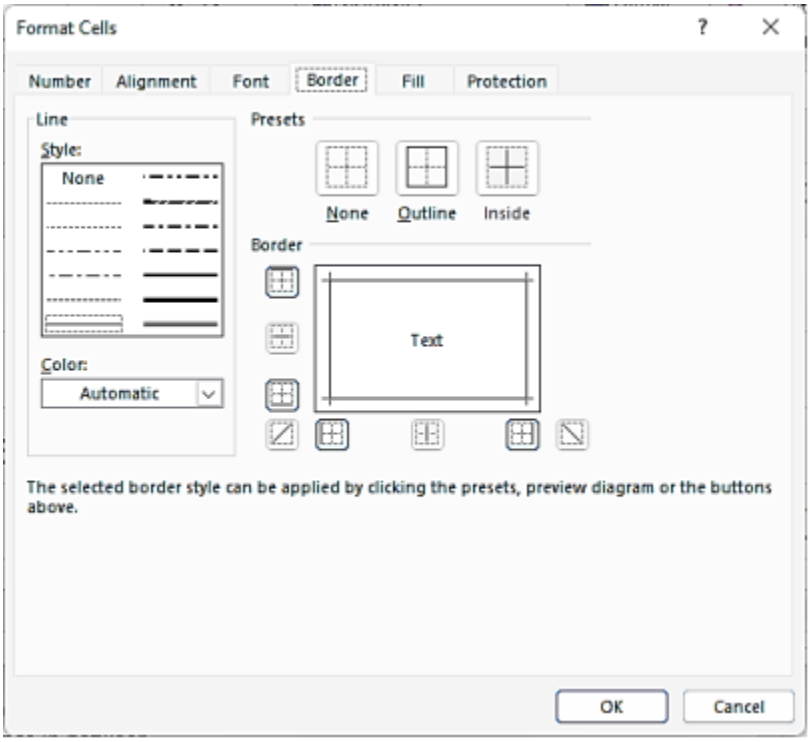
In addition to the default border options, you can also utilize custom borders, which provide the flexibility to modify the color and thickness of the border that you wish to use in an Excel worksheet.

Select cell **B3** in the '**Assignment 1'** worksheet before you proceed.

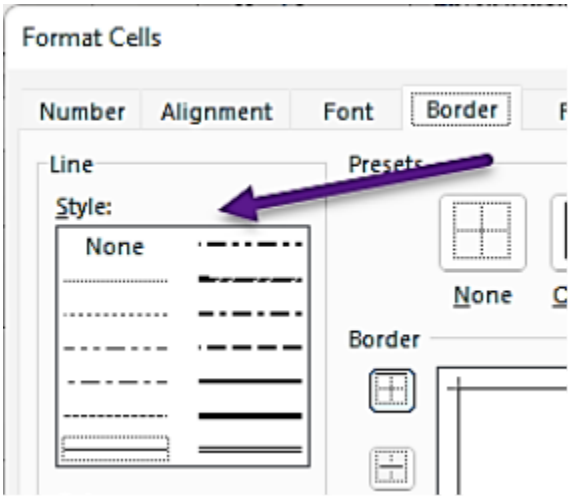
From the drop-down list, click on **More Borders** to create custom borders.



The **Format Cells** dialog box will be displayed, showing **Border** tab features.



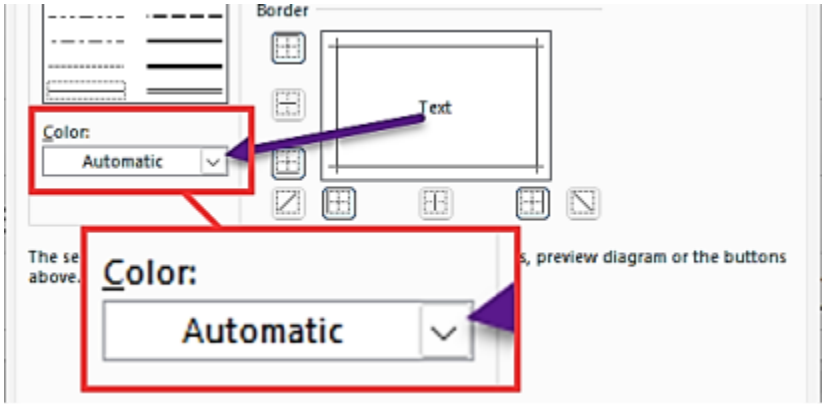
The line **styles** section allows you to customize the Borderline style.



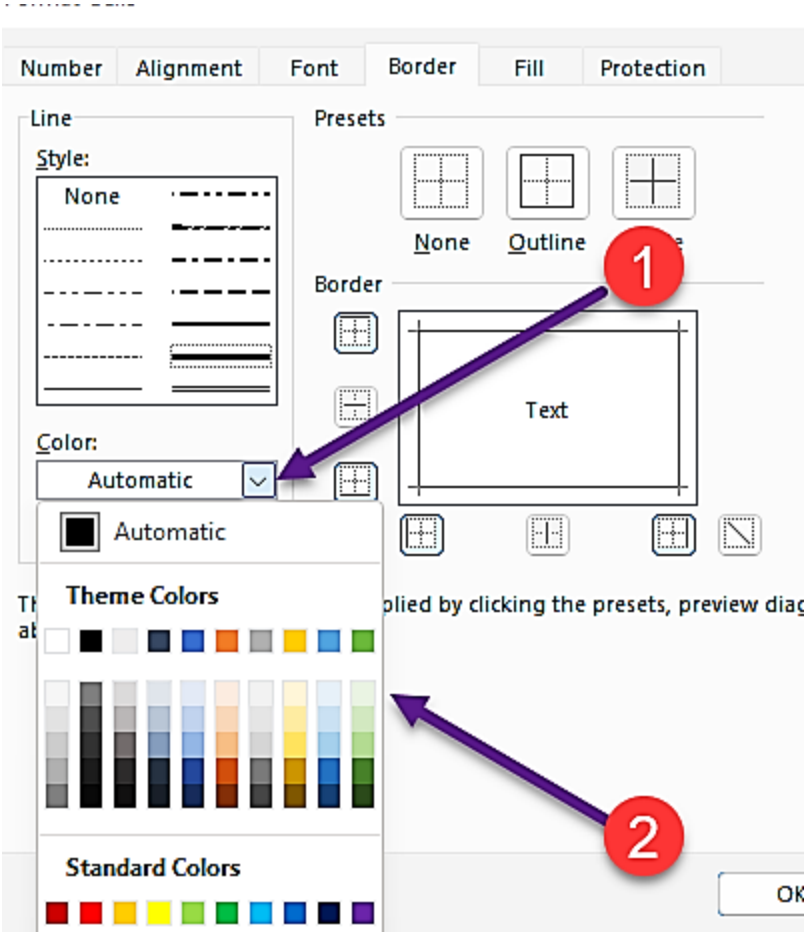
Amongst these line styles are:

- **Solid line**: This is a continuous line with uniform thickness throughout its length.
- **Dashed line:** This is a line made up of equal-length dashes with spaces in between.
- **Dotted line:** This type of line has several dots of equal length and equal distance.
- **Double line:** This is a combination of two parallel solid lines separated in between.

Below the **Line** styles, you have the **Color** segment, which allows you to change the **Borderline** color.

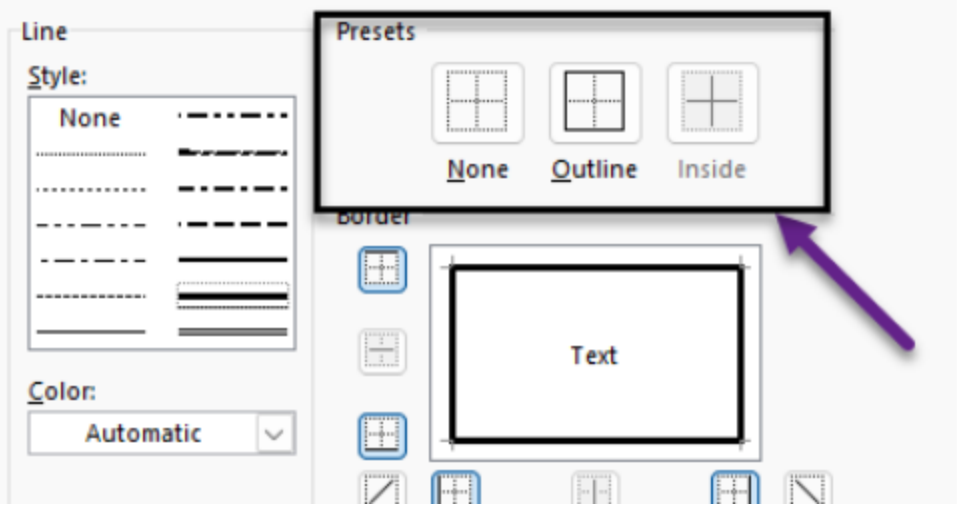


You need to click on the drop-down arrow to make a selection from a group of color pellets.



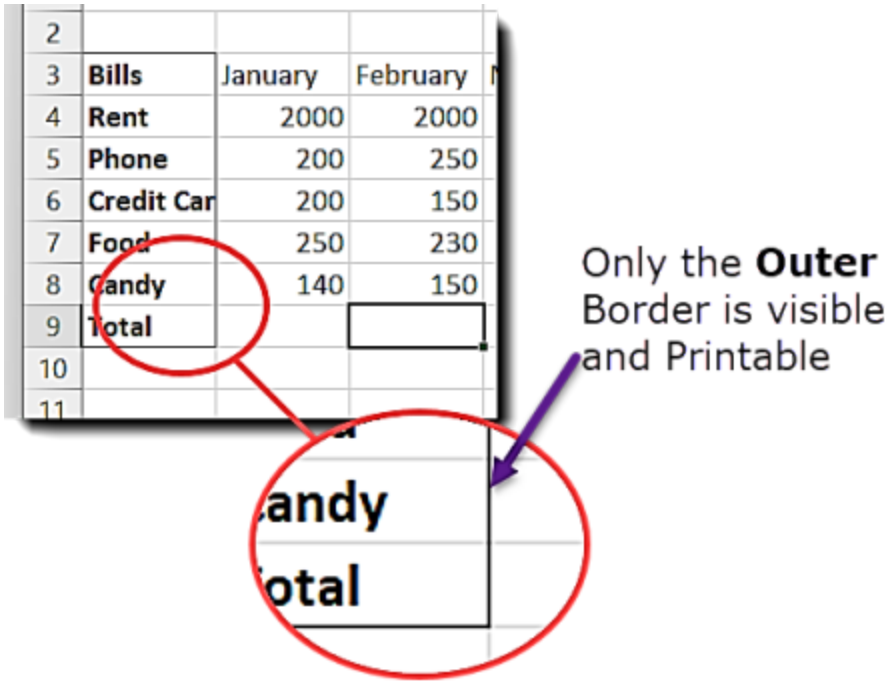
Select colors that enhance the visual appeal of your worksheet, while avoiding any colors that might obscure the data.

The Presets section on the right side of the dialog box has three options.



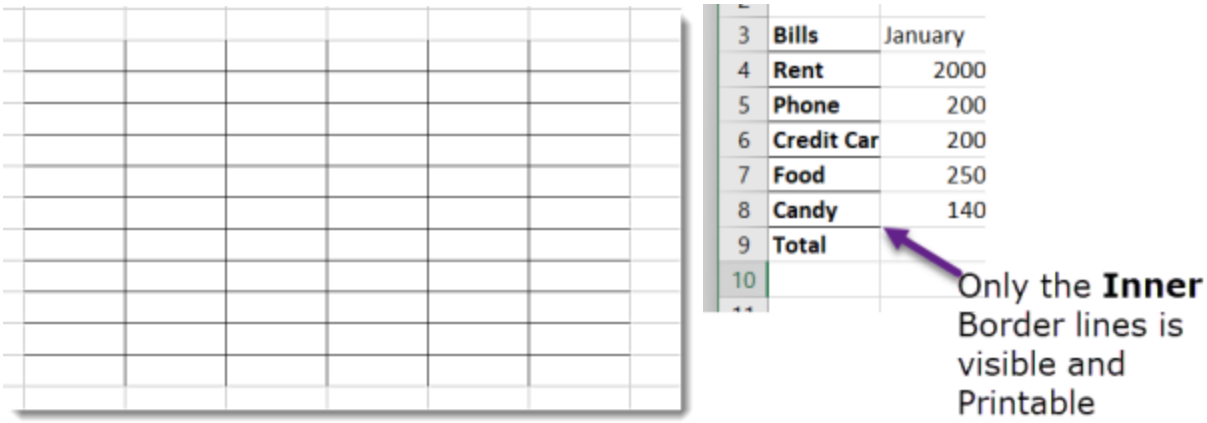
- **None** button removes border lines from the selected cell or group of cells, which can be crucial when customizing border lines in a worksheet.
- **Outline** allows you to insert outer border lines only.

For instance, if you select cells **A3** to **A9** in the **Assignment 1** workbook you created, under the Preset, choose the **Outline**, and click the **OK** button.



This action will make only the **Outer** border frames to appear, leaving the inner cell frames.

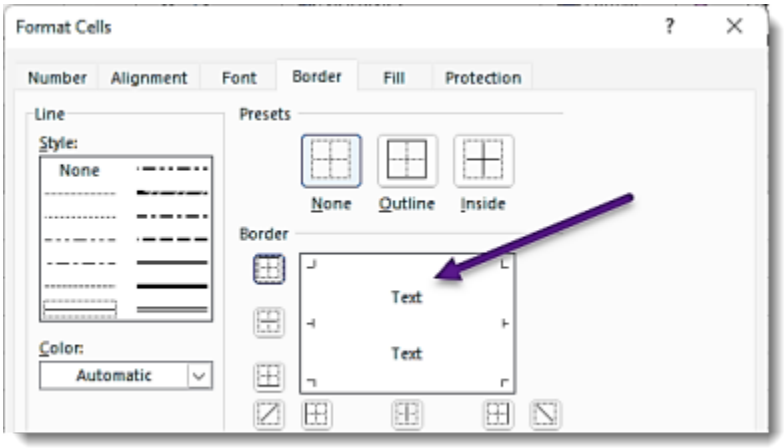
- The **Inside** preset is the opposite of the **Outer**. It displays only the border inner frames of the selected cells.



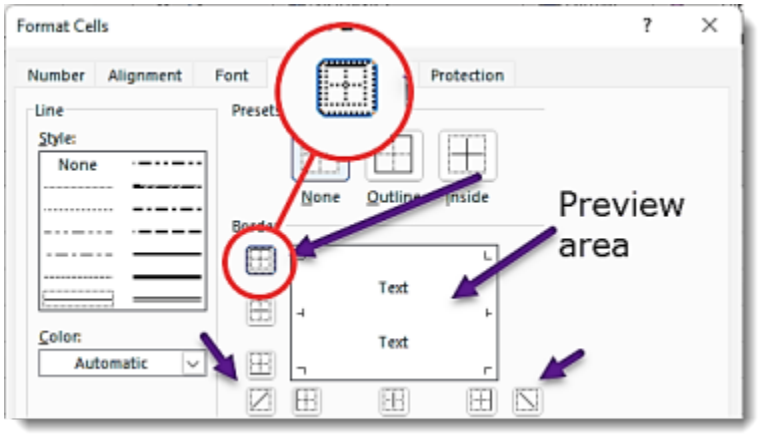
You can always click on the **None** preset to remove all the borderlines.



Finally, on the border tab you have the **Border** section**,** which allows you to manually add border lines to the cell or group of cells you selected.

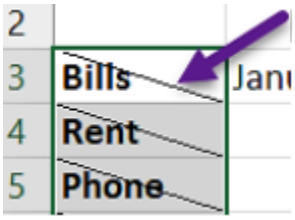


The position where your borderline will appear is represented by each box at the edge.

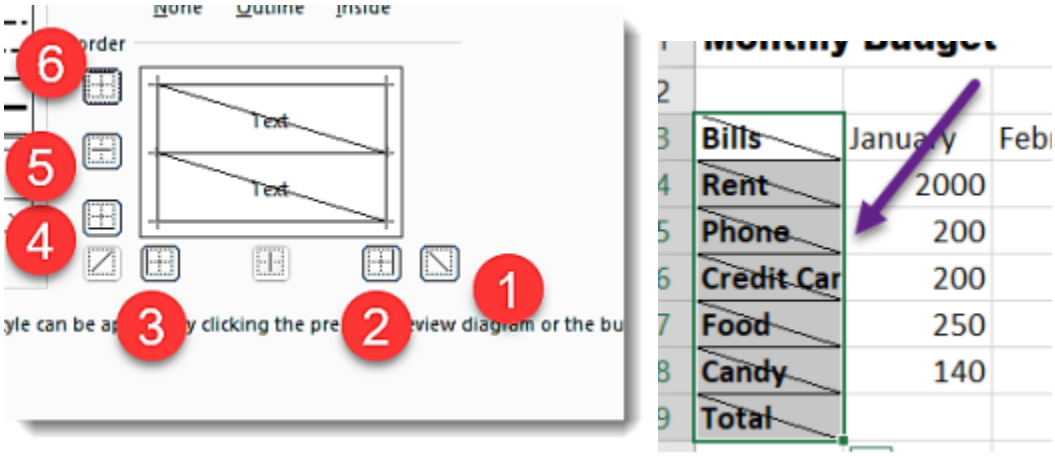


The Preview area displays how the lines will appear on the selected cells.

One unique feature of the **Border** section is the ablity to add diagonal lines across a cell.

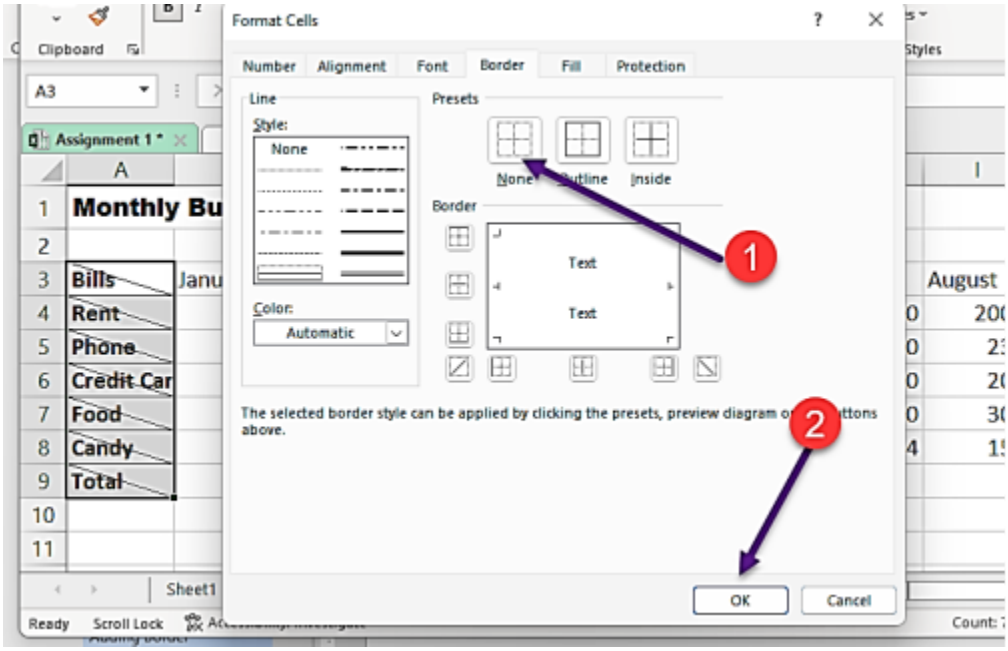


Outer and Right diagonal lines only



The above illustration shows how the border lines was applied to the selected cells and the final result after clicking on the **OK** button.

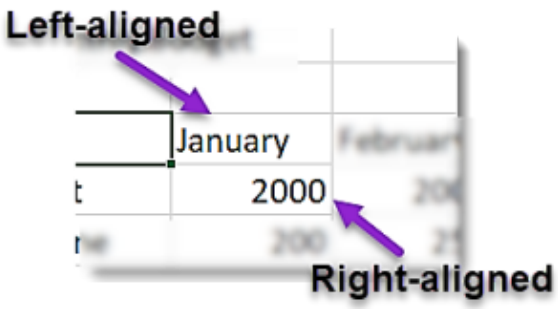
To remove the border from the selected cells, go back to the Border tab on the **Format cells** dialog box and click on **None** in the preset section.



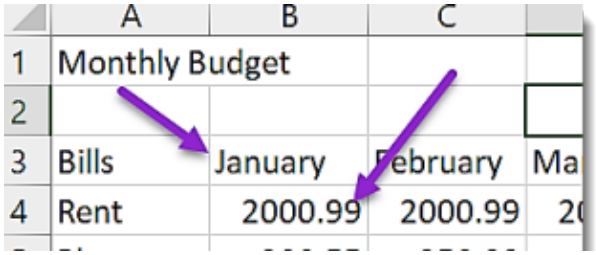
CELL CONTENT ALIGNMENT AND ORIENTATION

The default alignment for text you entered into a worksheet is bottom left, while numerals are aligned to the bottom right.

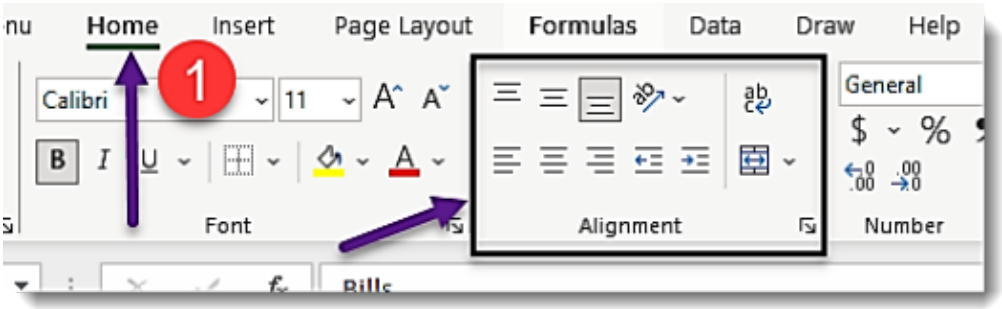
Aligning the content within a cell enhances its readability.



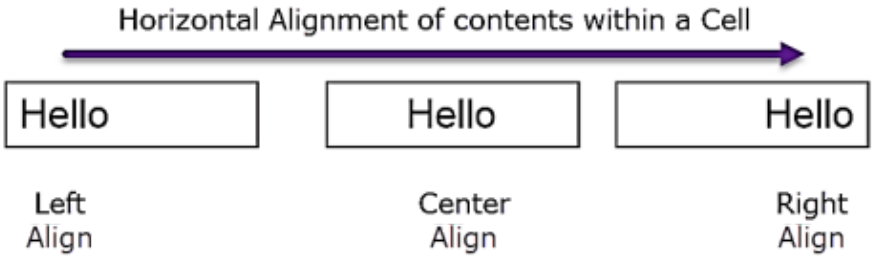
Decimal places get neatly aligned to the right to have a more polished look.



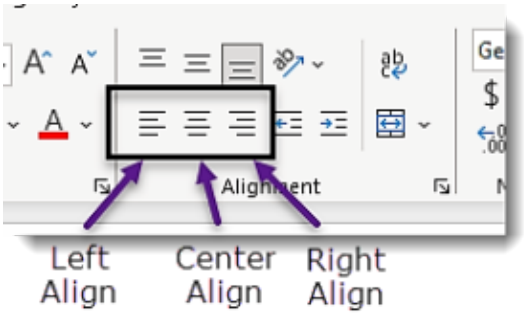
The **Home** tab has the **Alignment** group dedicated to cell alignment.



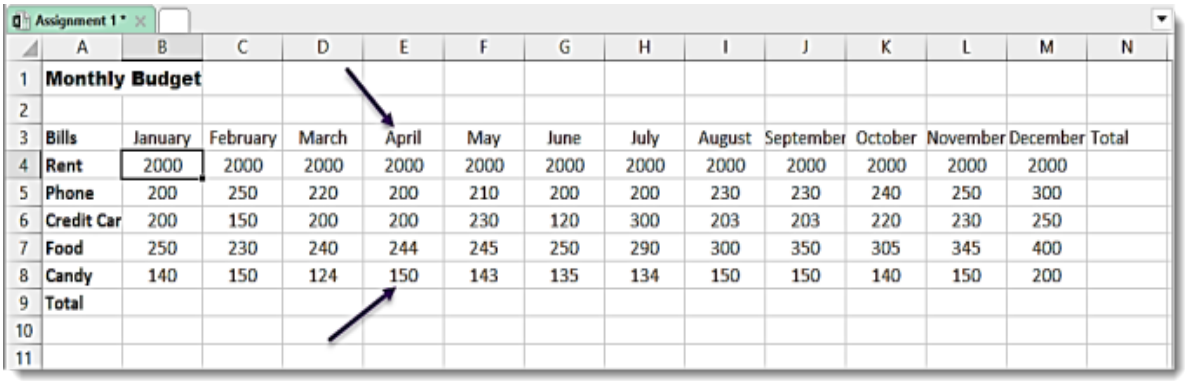
Within the **Alignment** group, you can choose to horizontally or vertically align text within a cell. The horizontal alignment option enables you to shift the content from the left edge of the cell to the center or right edge.



Select the cells you want to change the alignment, go to the **Alignment** group under the **Home** tab, then select any of the Horizontal alignments commands.

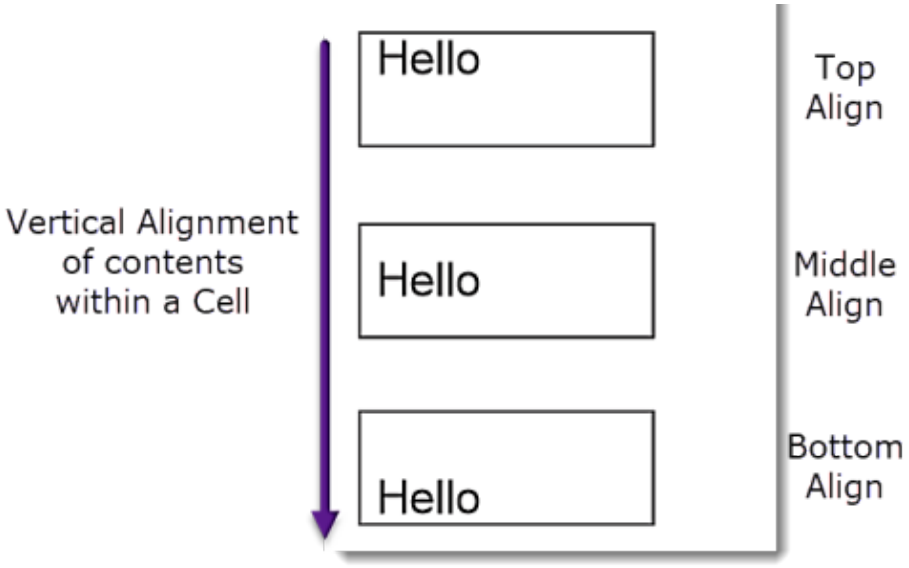


So on the **Assignment 1** workbook you must have created, select all the **Months** and their values and have them **Center Aligned**.

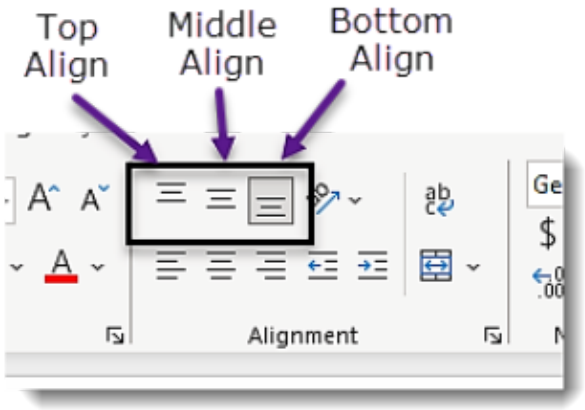


	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	**Monthly Budget**													
2														
3	**Bills**	January	February	March	April	May	June	July	August	September	October	November	December	Total
4	**Rent**	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	
5	**Phone**	200	250	220	200	210	200	200	230	230	240	250	300	
6	**Credit Car**	200	150	200	200	230	120	300	203	203	220	230	250	
7	**Food**	250	230	240	244	245	250	290	300	350	305	345	400	
8	**Candy**	140	150	124	150	143	135	134	150	150	140	150	200	
9	**Total**													
10														
11														

Vertical alignment allows you to move the content of a cell from the Top edge of the cell to the Middle, then to the Bottom edge of the cell.



Select the cells you want to change the alignment, go to the **Alignment** group under the **Home** tab, and then select any vertical alignments commands.



The vertical alignment goes well on cells whose row height is higher than the default dimension. For any cell whose height must have increased for one reason

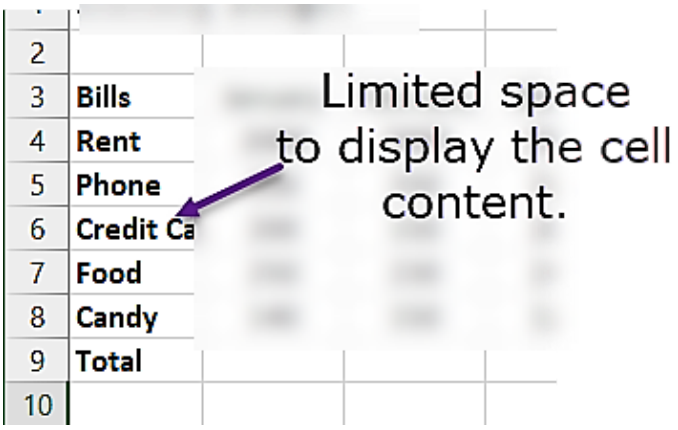
or the other, you can use the vertical alignment commands to adjust the position of the content within the cell.

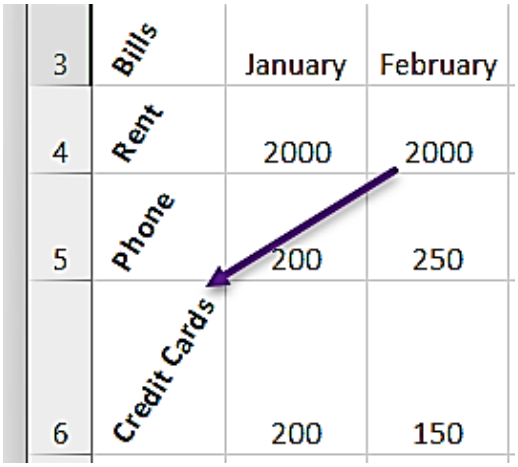
Text Orientation

An Excel cell text orientation refers to the angle at which the content of a cell is displayed.

By default, when you enter data into a cell, it is oriented horizontally, but you can change it to vertical or diagonal.

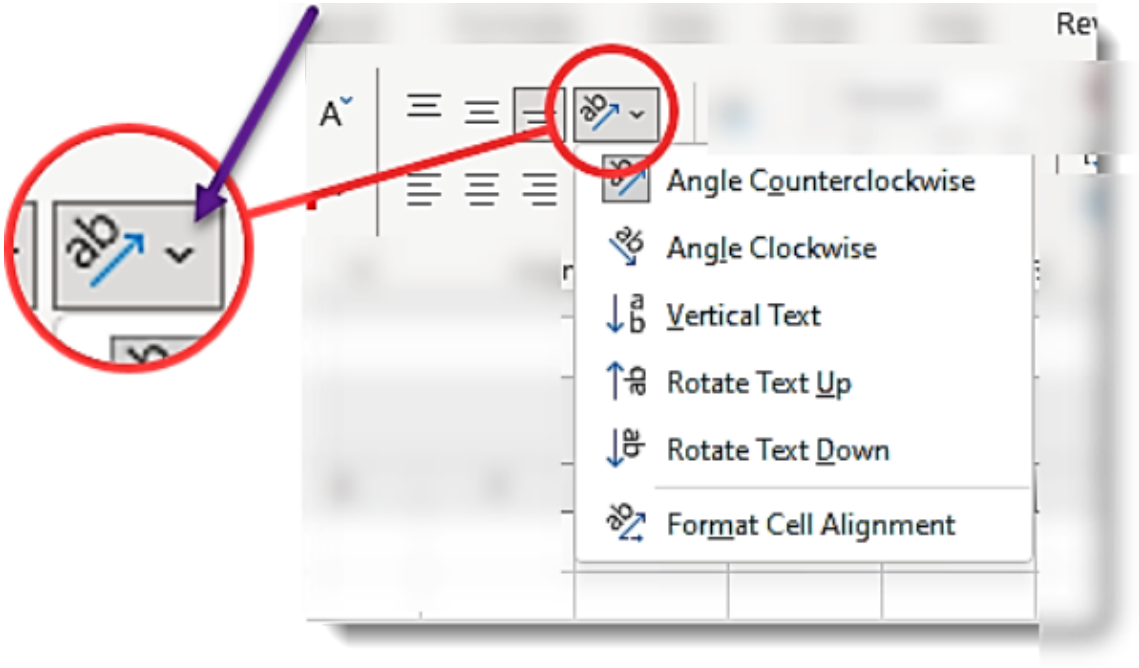
This feature may be helpful when you want to fit more information into an acceptable amount of cell space.



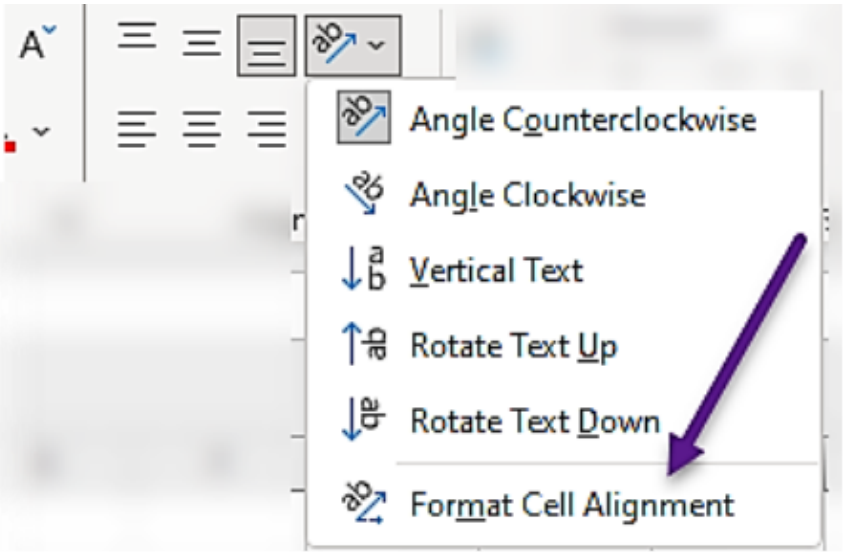


Before ***After***

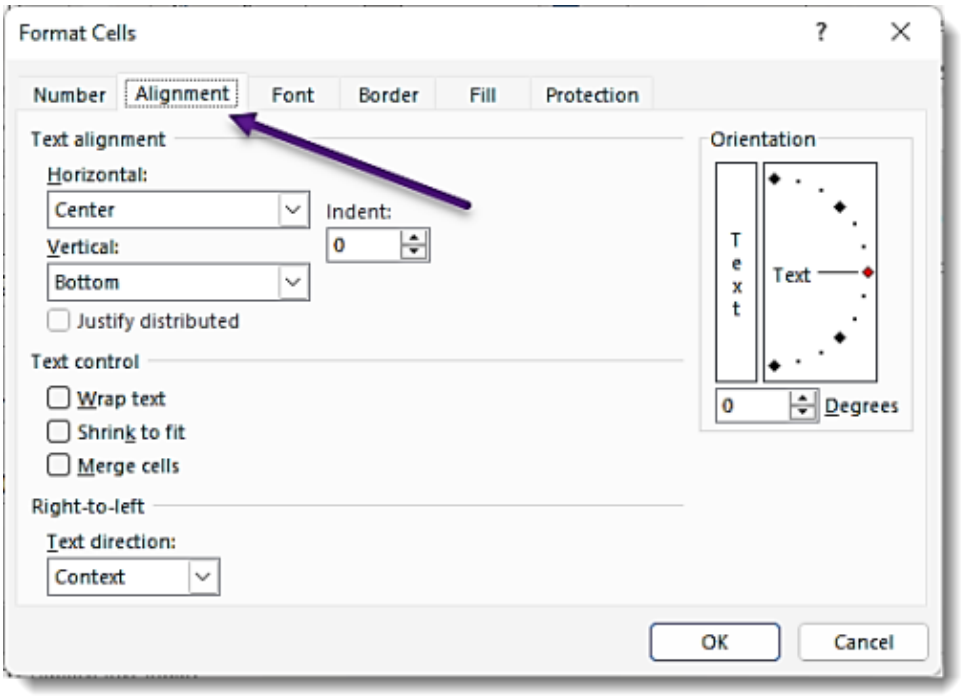
To alter the text orientation of a cell or a range of cells in Excel, click the drop-down arrow near the text orientation icon to view the available options.



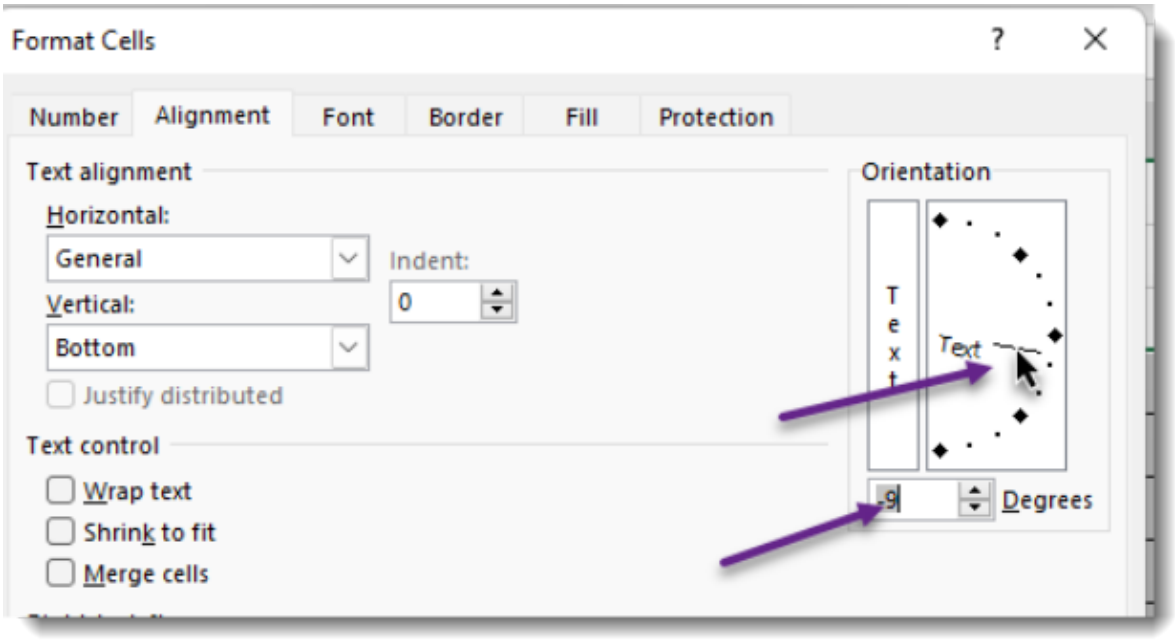
The option for **Format Text Alignment** enables you to set the angle, in degrees, at which Excell will display the cell content orientation.



It opens the **Format Cells** dialog box and displays the features on the **Alignment** tab.

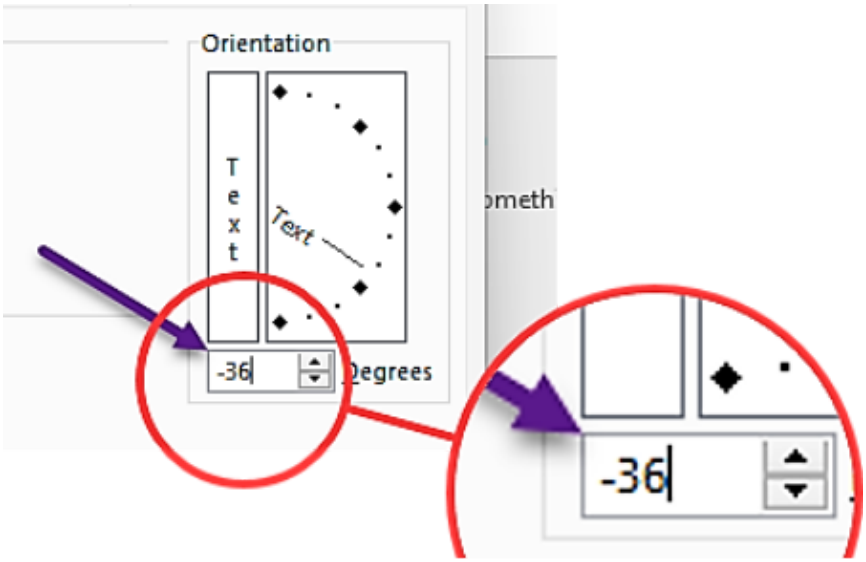


Your focus here is on the **Orientation** section on your right.



Clicking and dragging the "**arm**" allows you to adjust the text orientation angle in degrees.

Rotating the text using the "**Degrees box**" gives you a precise result.

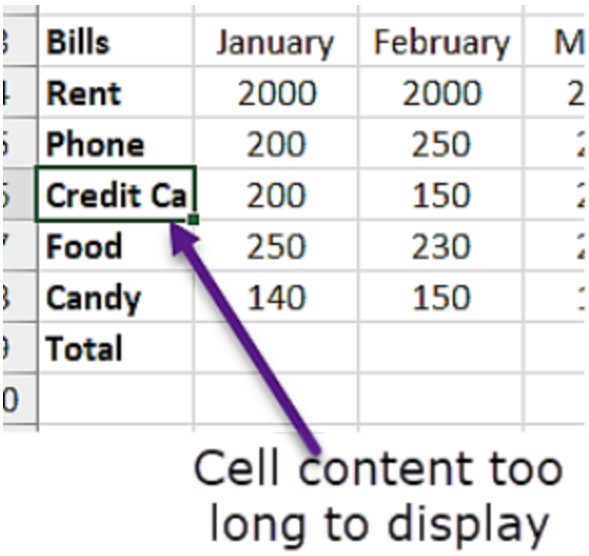


You can achieve this by inputting a negative value to rotate the text counterclockwise or a positive value to rotate it clockwise.

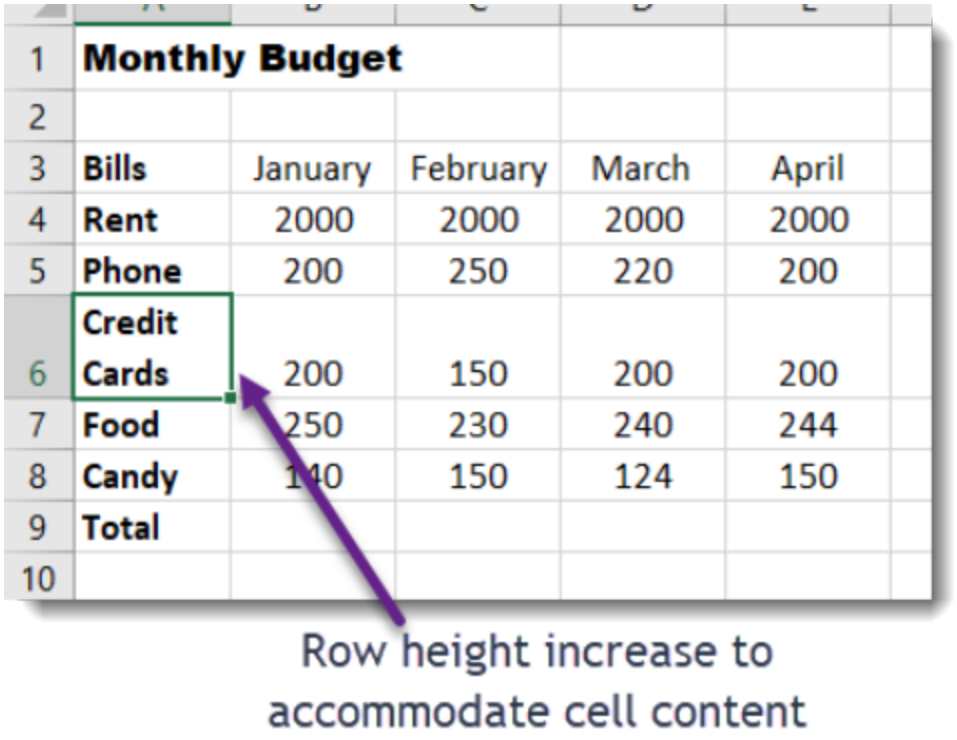
Note: The text orientation command may cause difficulty reading data or adjusting the cell size. Therefore, I recommend you use it cautiously and only when needed.

WRAP TEXT

The Wrap Text command enables you to present lengthy text in a cell across multiple lines, making it easier to read.

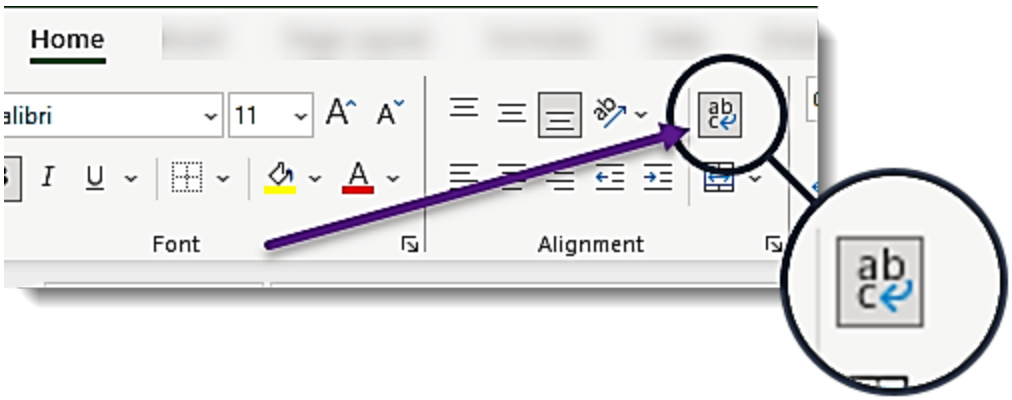


Enabling the Wrap Text feature will adjust the cell's height to accommodate multiple lines of text instead of displaying a single, long line that exceeds the cell's space. By doing so, your data becomes more understandable and readable. Nonetheless, applying the Wrap Text feature will increase the height of all cells in that row, potentially resulting in a slightly unusual appearance for your worksheet.

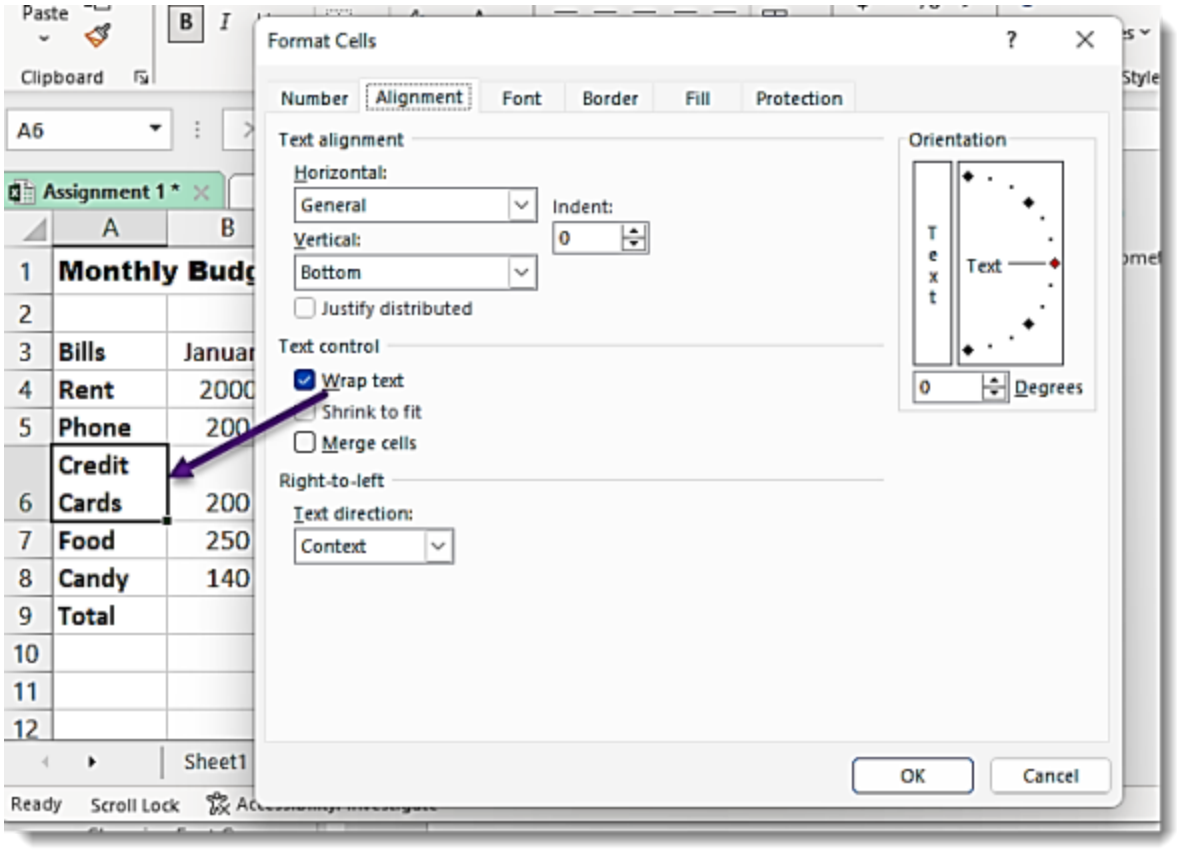


There are different ways to apply the Wrap Text command, and you have to select the cell or cells you want to wrap the cell content.

Next, click the **Wrap text command** on the **Alignment** group under the **Home** tab.



You can also use the **Format Cell** dialog box to access the Wrap Text command under the **Alignment tab**.

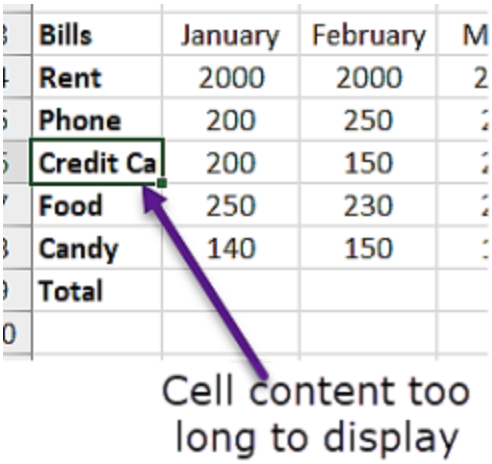


Click the **OK** button to verify that the content in the selected cell is wrapped.

The cell may need to be adjusted if the width of the column is not large enough for the wrapping effect to appear.

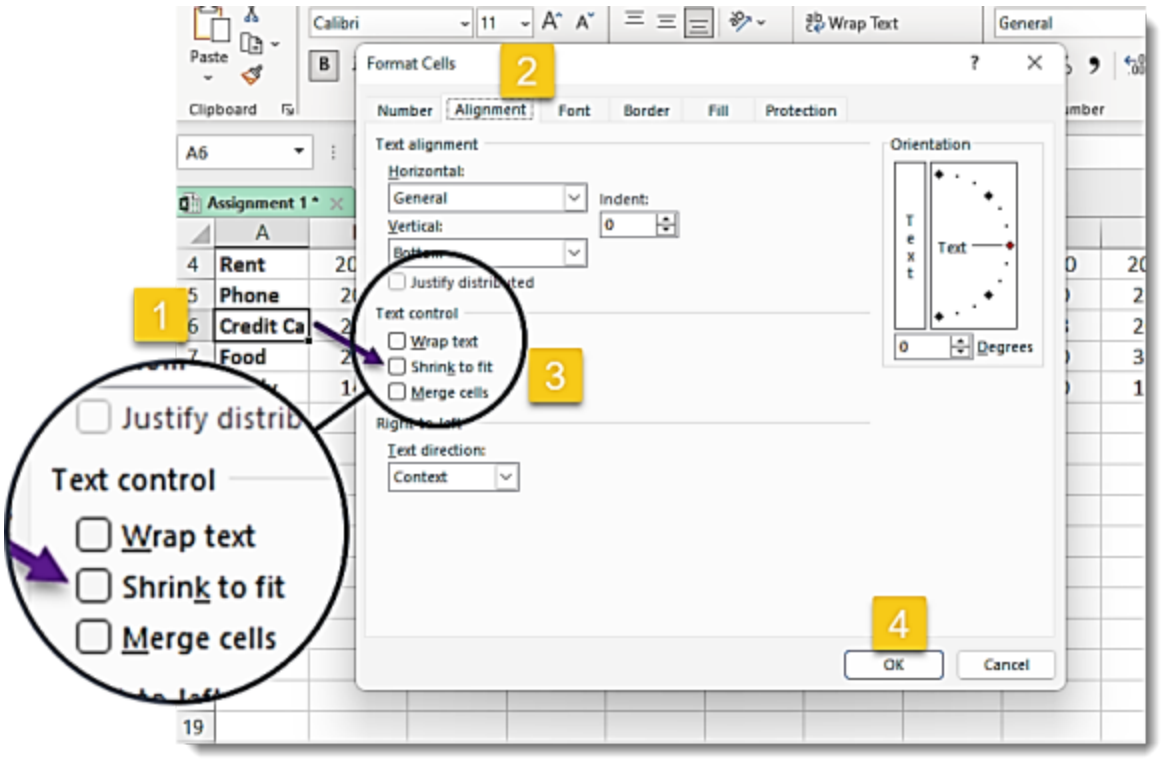
SHRINK TO FIT

Shrink to Fit is an option that allows you to automatically reduce the font size of the text in a cell for it to fit within the boundaries of the cell.

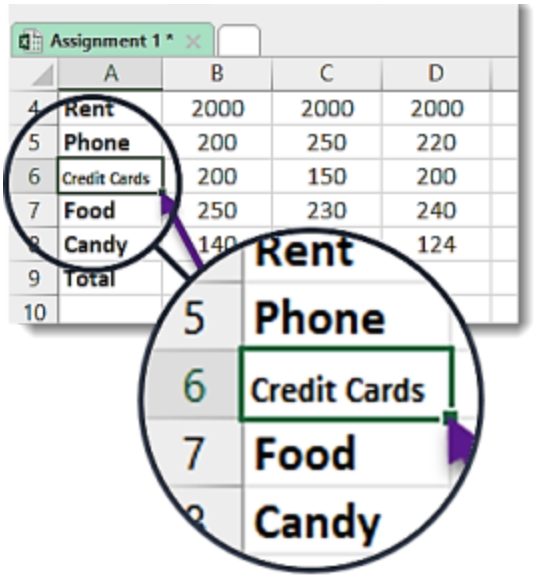


In several situations, using the **Wrap Text** command is not applicable when you want all the text in a cell or range of cells to be visible without manually adjusting the font size for every cell.

The **Shrink to Fit** command becomes the only option to maintain uniform row height and column width on a worksheet.



When done, click the **OK** button, and your text will automatically resize to fit within the selected cells.

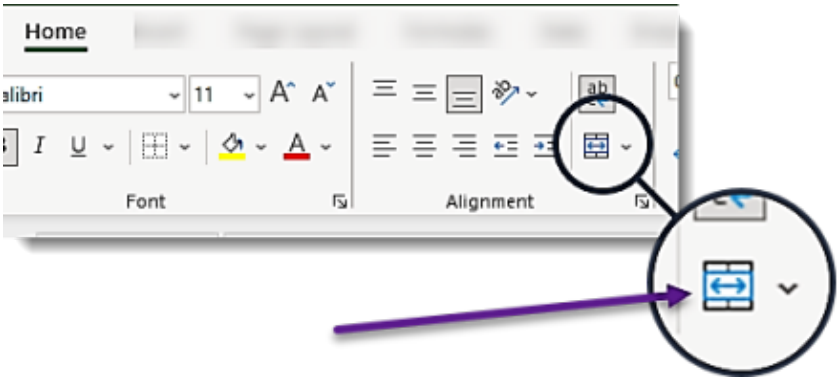


Although the cell content may appear smaller than the default font size, this will ensure all the text is visible within the cell's boundaries.

MERGE CELLS

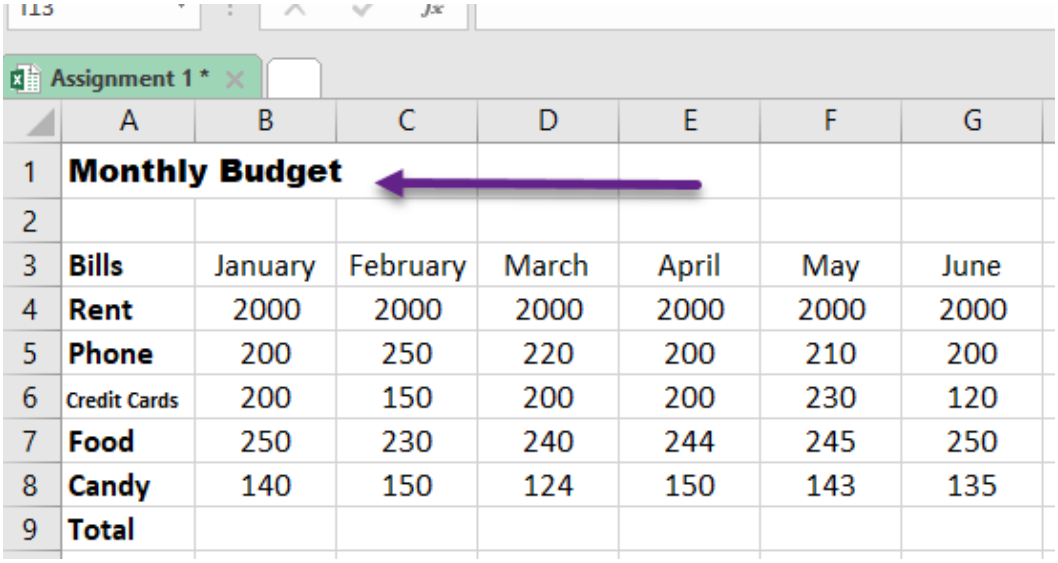
The **Merge Cells** function in Excel allows you to merge multiple cells into one cell, thereby combining their contents. This formatting feature can generate neat and structured tables or combine cells containing relevant information within a single table.

Under the **Home** tab, you will find the "**Merge & Center**" command in the **Alignment** group.



Select the cells you want to merge from the list of cells before using the "**Merge Cells**" command. After you click the **Merge Cells** command button, Excel will merge the selected cells into one cell.

In our **Assignment 1** worksheet, the content of Cell **A1** happens to be left aligned.

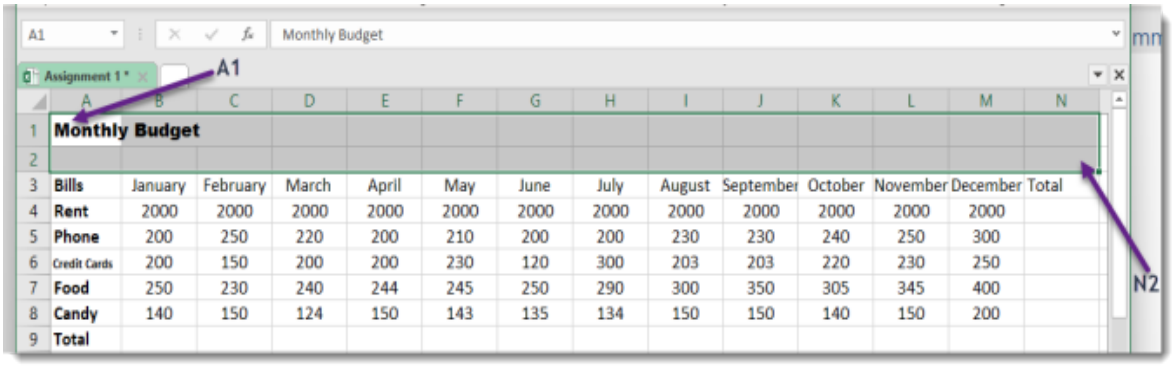


Assignment 1 *

	A	B	C	D	E	F	G
1	**Monthly Budget**						
2							
3	**Bills**	January	February	March	April	May	June
4	**Rent**	2000	2000	2000	2000	2000	2000
5	**Phone**	200	250	220	200	210	200
6	**Credit Cards**	200	150	200	200	230	120
7	**Food**	250	230	240	244	245	250
8	**Candy**	140	150	124	150	143	135
9	**Total**						

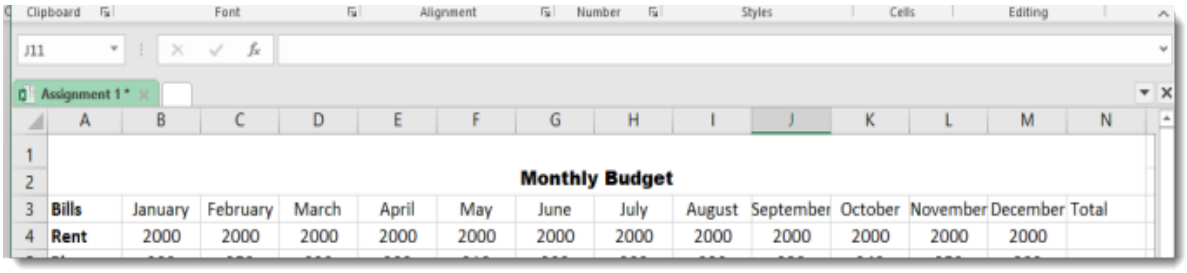
The heading "**Monthly Budget**" is to be centered. But this is not something you can do using only the **Center align** command.

Select the cell range **A1** to **N2** and click on the **Merge and Center** command button to have the heading centered after merging the range of cells.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	**Monthly Budget**													
2														
3	**Bills**	January	February	March	April	May	June	July	August	September	October	November	December	Total
4	**Rent**	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	
5	**Phone**	200	250	220	200	210	200	200	230	230	240	250	300	
6	**Credit Cards**	200	150	200	200	230	120	300	203	203	220	230	250	
7	**Food**	250	230	240	244	245	250	290	300	350	305	345	400	
8	**Candy**	140	150	124	150	143	135	134	150	150	140	150	200	
9	**Total**													

The merge and center command combines the selected cell into one cell called **A1.**



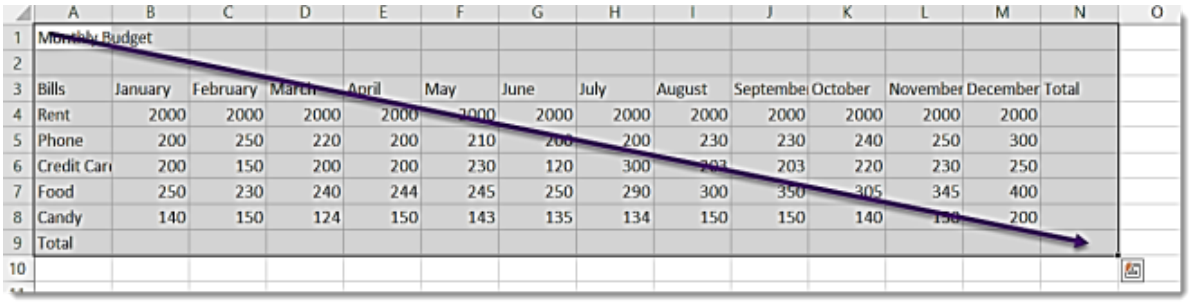
When merging cells, remember that any data in the merged cells, except for the top-left cell, will be lost.

AUTOFITING

At the beginning of working on an Excel worksheet, you may encounter issues where the cell height or width does not adequately accommodate the cell's content, which can result in columns or rows appearing awkward and unsuitable for presentation as a final product. **AutoFit** can provide a quick solution to these issues to some extent, but other formatting techniques may still be necessary to achieve the desired final result.

Let us start by highlighting the entire worksheet section where you want to apply the formatting.

With the workbook **Assignment 1** open, Click and drag from Cell **A1** to Cell **N9** to select the table as illustrated below.



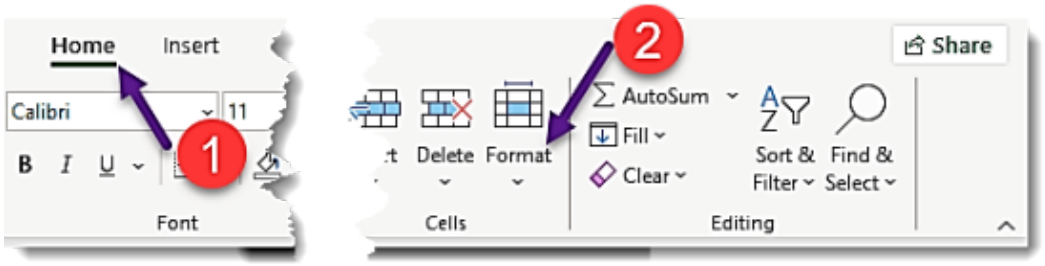
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Monthly Budget														
2															
3	Bills	January	February	March	April	May	June	July	August	Septembe	October	Novembe	December	Total	
4	Rent	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000		
5	Phone	200	250	220	200	210	200	200	230	230	240	250	300		
6	Credit Car	200	150	200	200	230	120	300	203	203	220	230	250		
7	Food	250	230	240	244	245	250	290	300	350	305	345	400		
8	Candy	140	150	124	150	143	135	134	150	150	140	150	200		
9	Total														
10															

Cell **A1** to Cell **N9** is the cell range that covers the entire table.

Your table might not fall under these cell ranges; the idea is to have practical experience highlighting a range of cells.

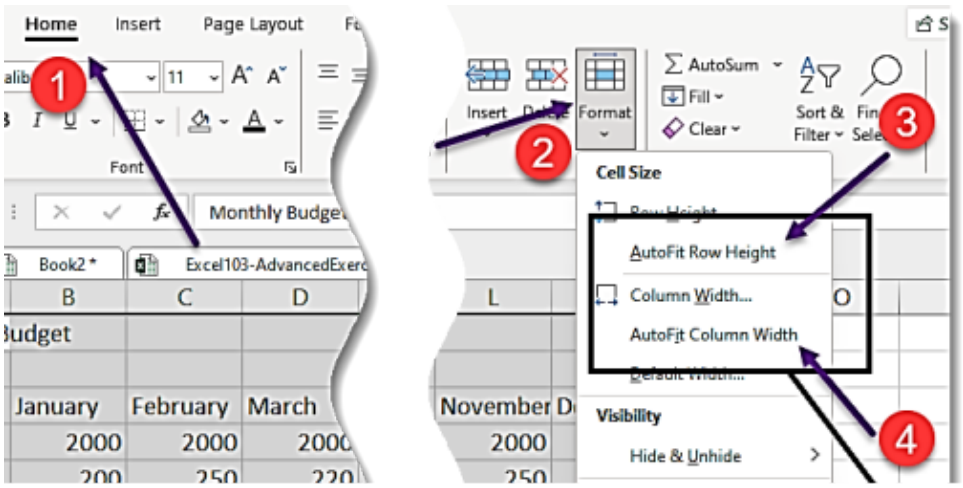
The next step is to AutoFit the cell columns and rows.

Go to the **Home** tab and click on **Format** in the **Cells** group.



Then under the drop-down menu, click on **AutoFit Row Height**.

Repeat the process and select **AutoFit Column Width**.



Below is what your table should look like, with some column widths more expansive than others.

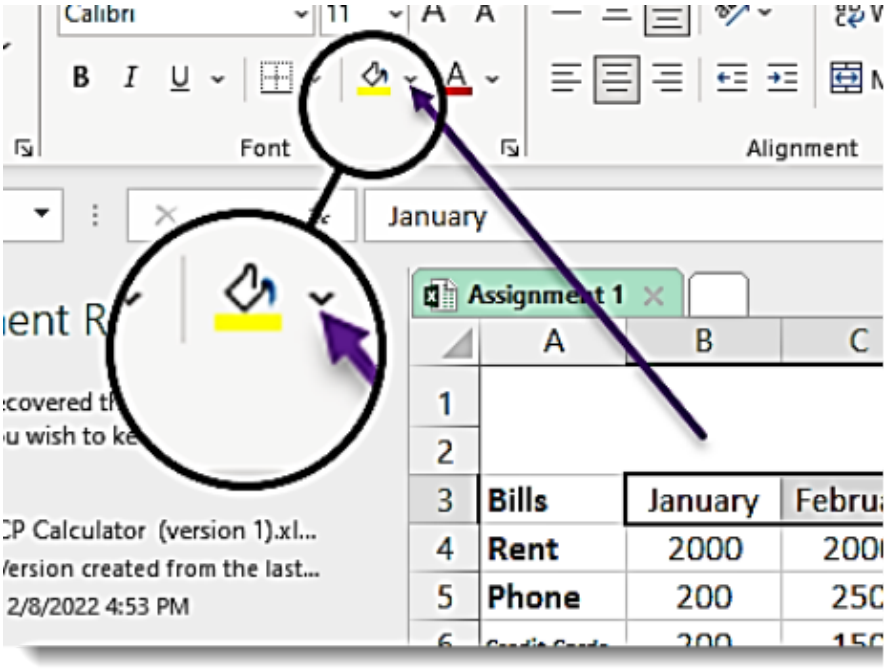
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Monthly Budget													
2														
3	Bills	January	February	March	April	May	June	July	August	September	October	November	December	Total
4	Rent	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	
5	Phone	200	250	220	200	210	200	200	230	230	240	250	300	
6	Credit Cards	200	150	200	200	230	120	300	203	203	220	230	250	
7	Food	250	230	240	244	245	250	290	300	350	305	345	400	
8	Candy	140	150	124	150	143	135	134	150	150	140	150	200	
9	Total													
10														

ADDING FILL AND TEXT COLOR

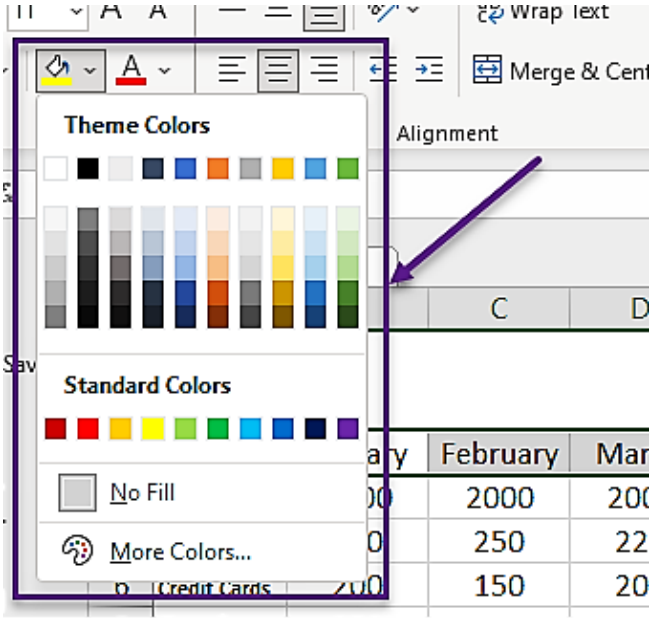
Excel applies a fill color to a cell or a group of cells within a worksheet, which acts as a background color. Using fill colors in a worksheet helps to make data more organized and easier to read. It also adds visual interest to the worksheet.

Select the cells or range of cells you want to add a fill color.

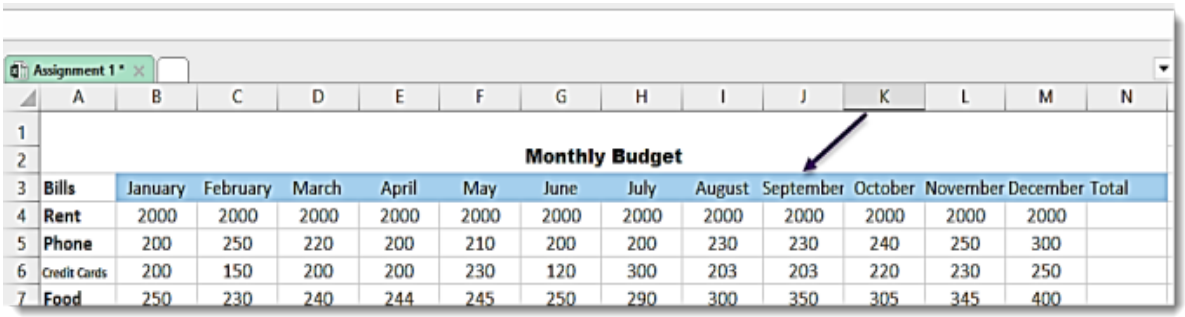
On the **Home** tab, locate the **Fill Color** command button under the **Font** group.



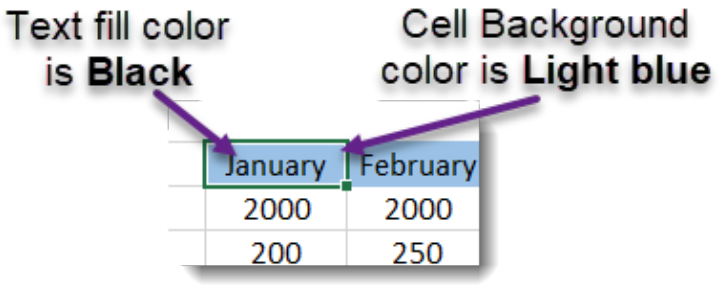
Click the **drop-down** arrow next to the Fill Color command to display the Fill Color palette.



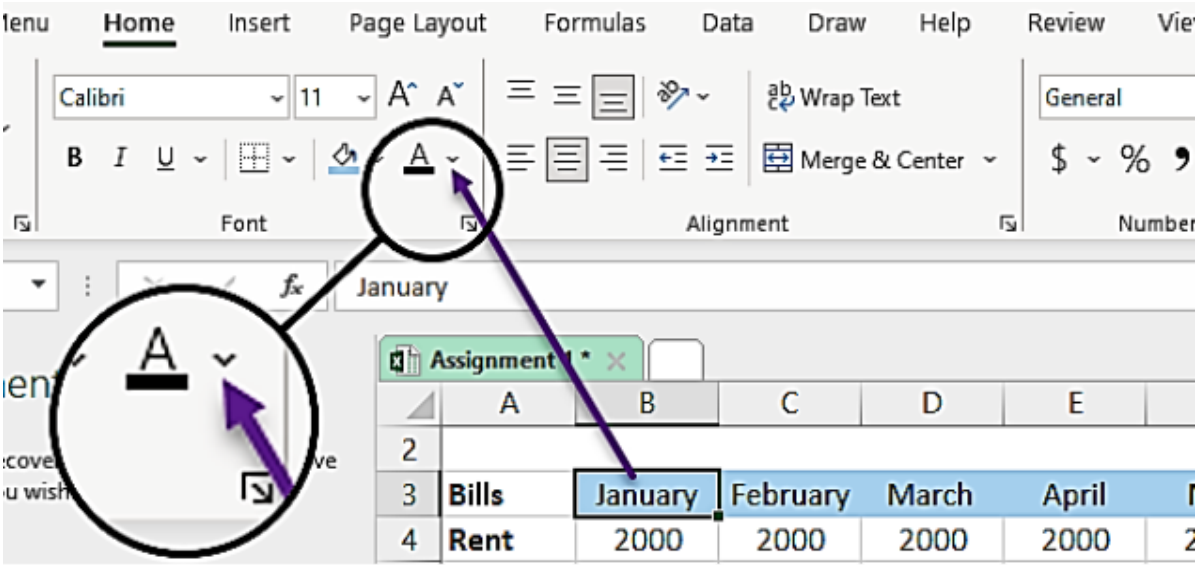
Next, select the color of your choice to fill your cells.



A cell's fill color is different from its text color.



A cell or range of cells can be colored using the "**Font Color**" button in the "**Font**" group under the "**Home**" tab of the ribbon.



It is important to ensure that the color selection you use for fill and text in Excel does not obstruct the data. So, always avoid using identical colors for both fill and text.

CELL STYLES

Cell styles provide pre-defined cell formats, allowing rapid and consistent worksheet formatting. By applying a single-cell style, a selected cell or group of cells can be quickly formatted with multiple formatting options. This makes cell styles a convenient way to format cells efficiently.

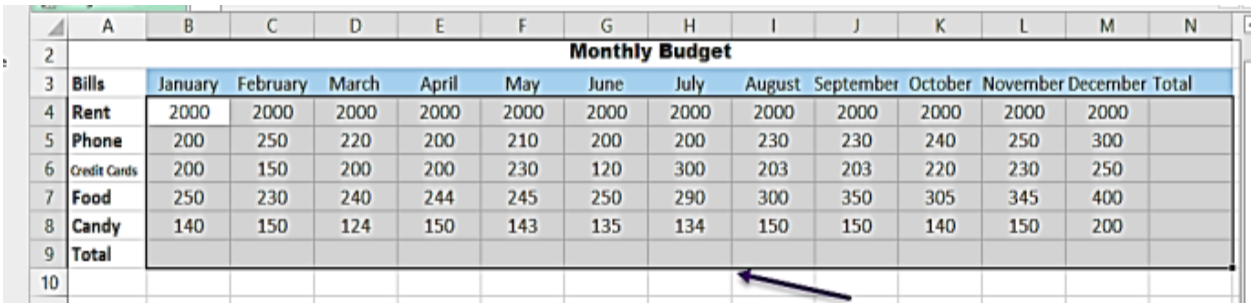
Applying cell styles on a worksheet change the format of the selected cell or range of cells in many ways, including

- using uniform font type, font size,
- text boldfacing or italic,
- borders, color, number outlines, and cell content alignments.

Follow these steps if you want to apply a cell style in Excel:

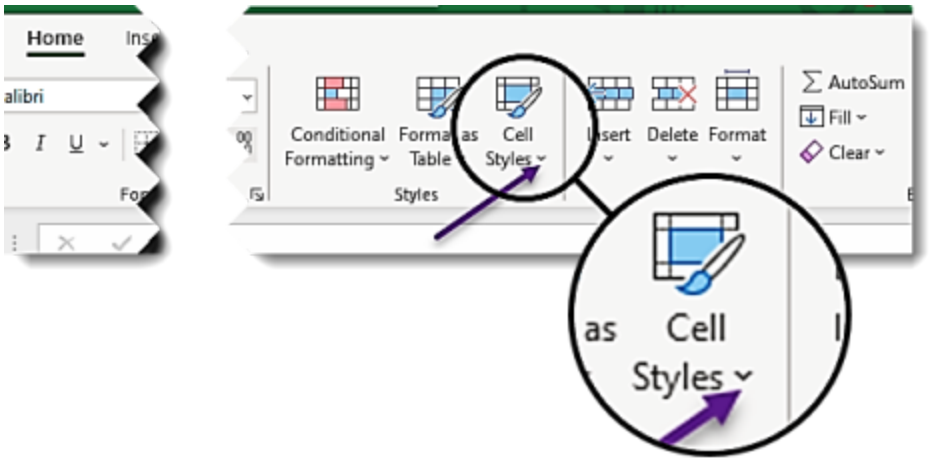
1. After opening your Excel workbook, go to the worksheet where the data you want to format is.
2. Select the cells you want to style.

To select multiple cells, hold down the **Shift** key and then press the arrow keys or drag your cursor over the rows of cells.

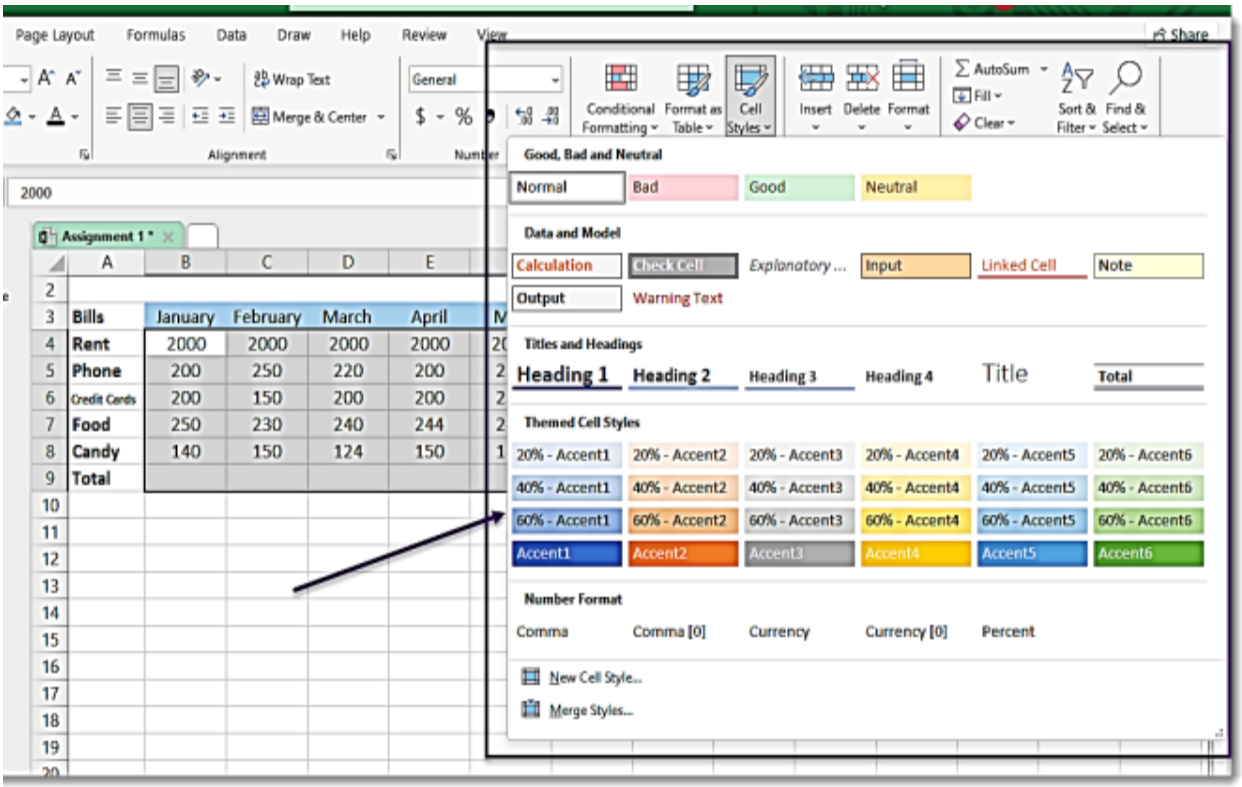


	A	B	C	D	E	F	G	H	I	J	K	L	M	N
2		Monthly Budget												
3	Bills	January	February	March	April	May	June	July	August	September	October	November	December	Total
4	Rent	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	
5	Phone	200	250	220	200	210	200	200	230	230	240	250	300	
6	Credit Cards	200	150	200	200	230	120	300	203	203	220	230	250	
7	Food	250	230	240	244	245	250	290	300	350	305	345	400	
8	Candy	140	150	124	150	143	135	134	150	150	140	150	200	
9	Total													
10														

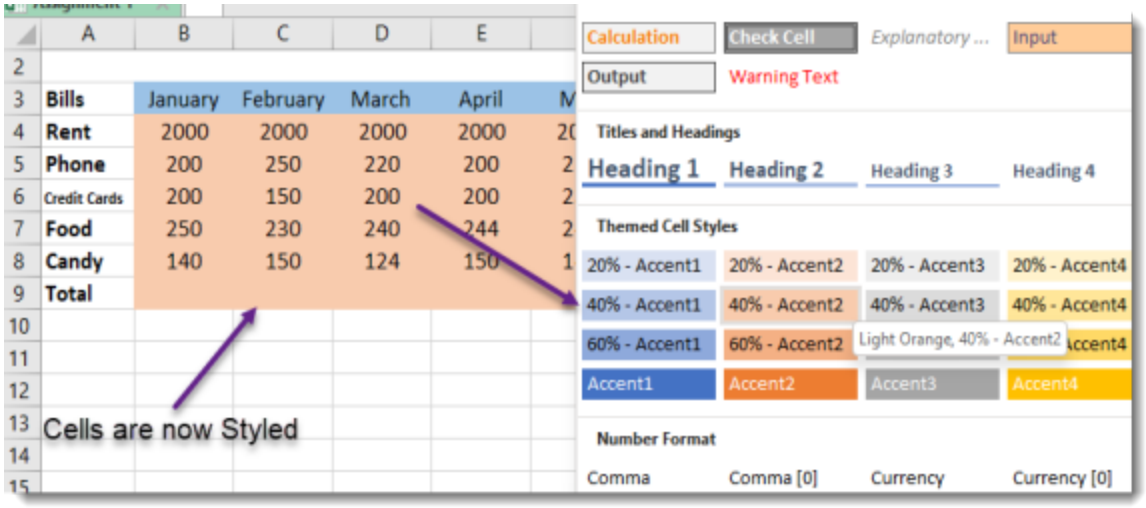
1. Click the **Home** tab, go to the **Styles** Group and click the arrow beside the **Cell Styles** command button.



A drop-down menu of available cell styles appears immediately.

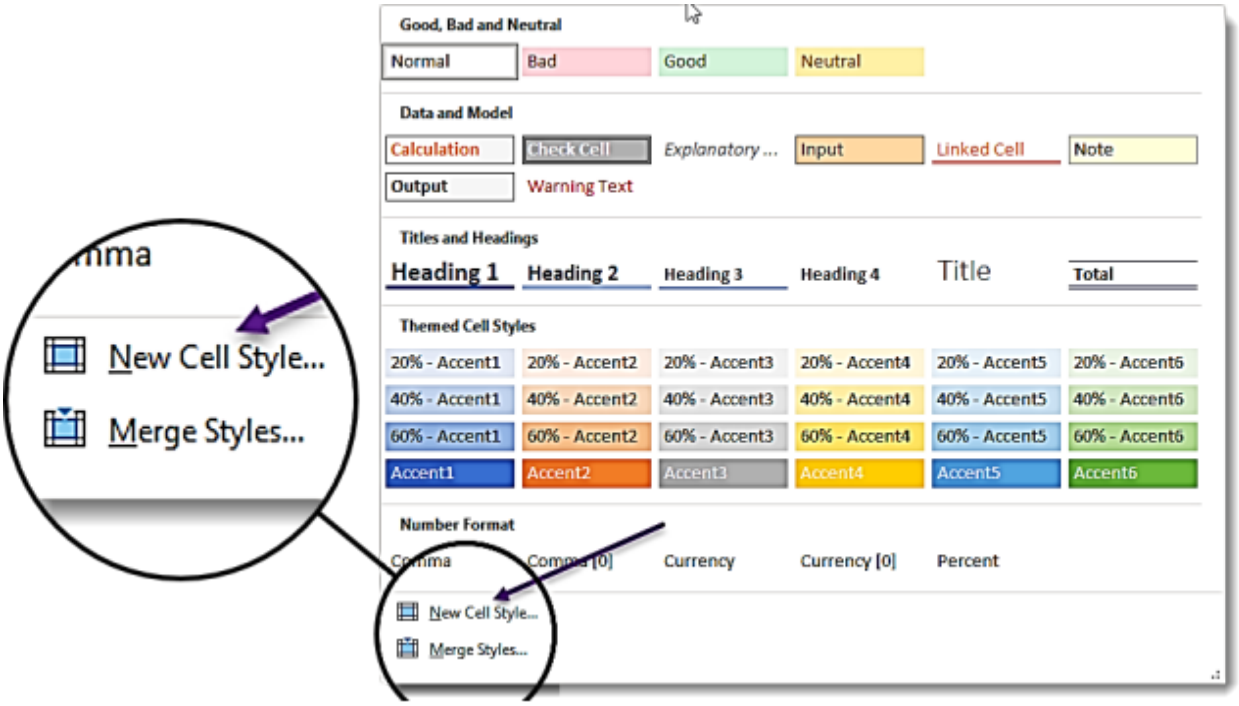


1. You can preview the style on the selected cells in Excel to see what it will look like when applied. Once you have found a style you like, click on it to apply the formatting to your worksheet.

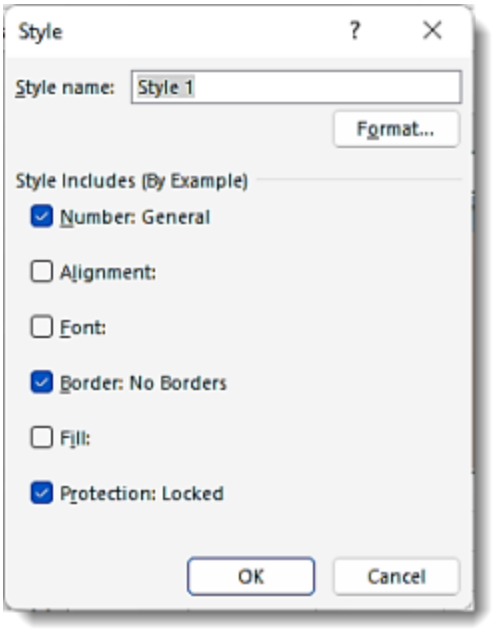


A wide variety of cell styles are available in Excel, including styles for headings, values, and totals.

The Cell Styles gallery also allows you to create your **custom cell styles** by selecting the cells you want to include in the style and then clicking the **New Cell Style** button to open the Cell Styles gallery.



It will open the Style dialog box, allowing you to name the style and change the formatting options displayed.



Click the **OK** button when done to save the custom cell style you just created.

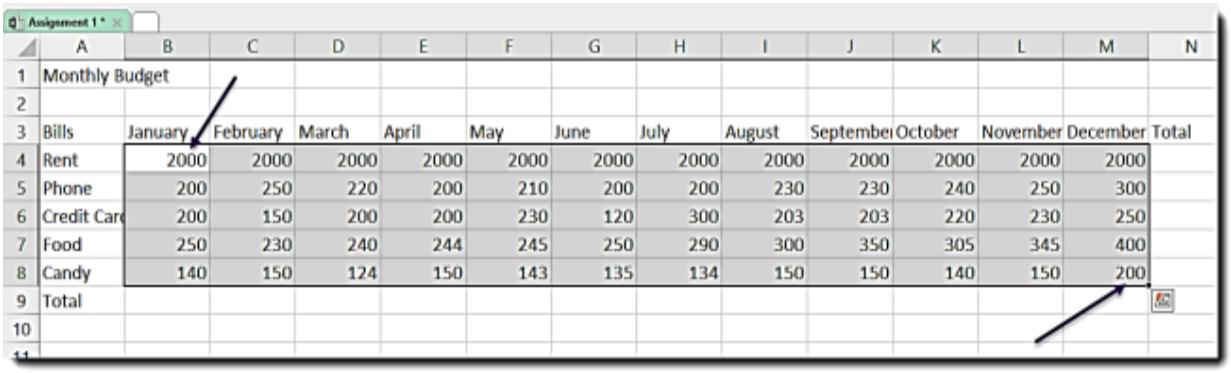
NUMBER FORMATTING

In Excel, you can format the way numerical data appears on your worksheets by using the number formatting tools. You can add a thousand separators, adjust the decimal place display, or even format negative numbers with parentheses or different font colors in addition to adding thousands of separators.

Follow these steps to apply number formatting to a cell or a range of cells:

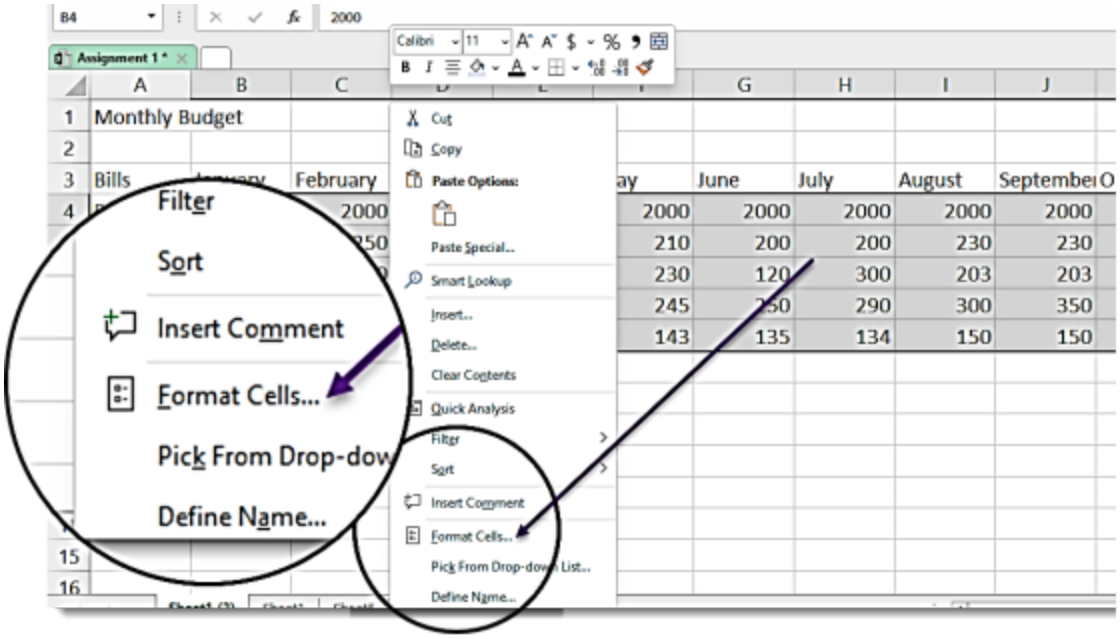
1. The first thing you need to do is select the cell or range of cells that you wish to format.

As illustrated below, the numerals in the cell range **B4:M8** were selected.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Monthly Budget													
2														
3	Bills	January	February	March	April	May	June	July	August	Septembe	October	November	December	Total
4	Rent	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	
5	Phone	200	250	220	200	210	200	200	230	230	240	250	300	
6	Credit Car	200	150	200	200	230	120	300	203	203	220	230	250	
7	Food	250	230	240	244	245	250	290	300	350	305	345	400	
8	Candy	140	150	124	150	143	135	134	150	150	140	150	200	
9	Total													
10														

1. Next, Right-click on the highlighted cell or range of cells.

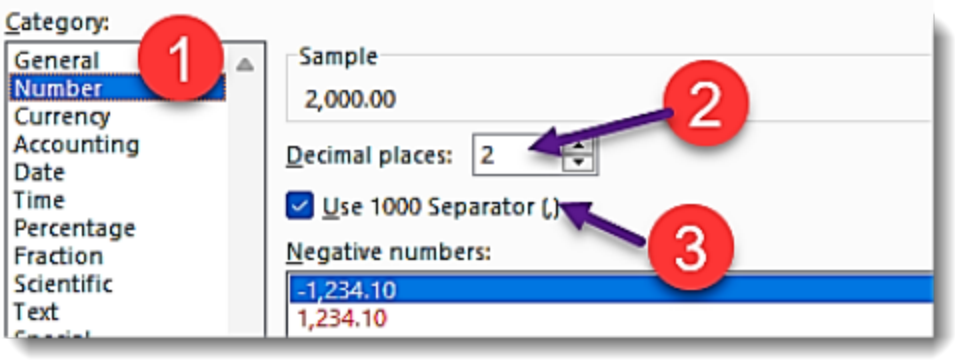


1. From the context menu that appears after you have right-clicked, select **Format Cells.**
2. Choose the "**Number**" tab from the **Format Cells** dialog box that appears.



Next, select the type of number format that you would like to use under "**Category**" on the left.

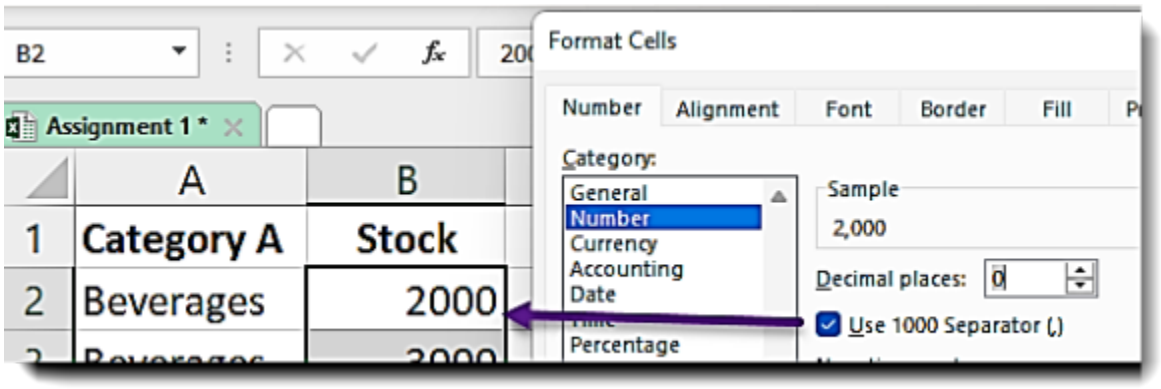
For example, several kinds of numbers can be displayed, such as numbers with a thousand separator and a specified number of decimal places



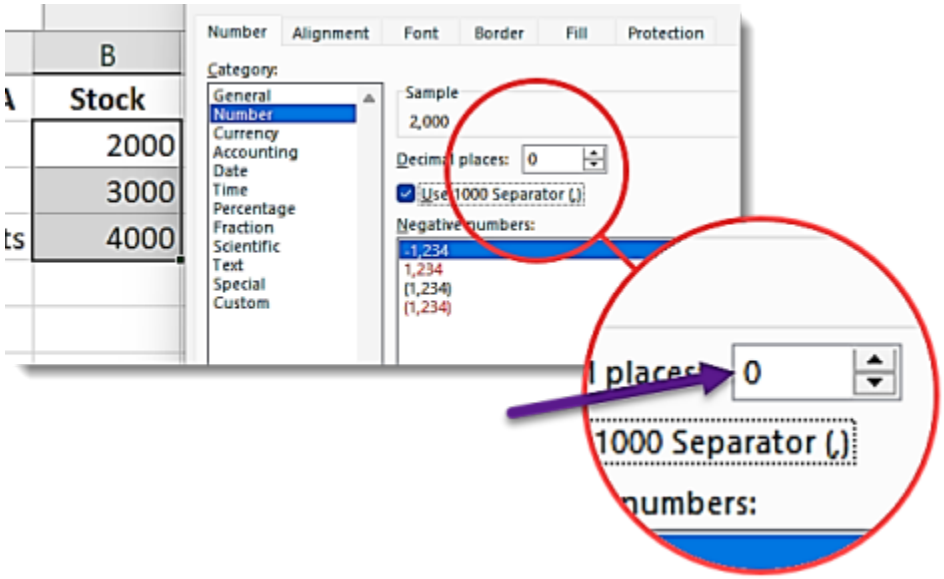
This means you want your numerals to appear with two decimal places and a thousand separators using a comma.

	Bills	January	February	March	April	May
4	Rent	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00
5	Phone	200.00	250.00	220.00	200.00	210.00
6	Credit Cards	200.00	150.00	200.00	200.00	230.00
7	Food	250.00	230.00	240.00	244.00	245.00
8	Candy	140.00	150.00	124.00	150.00	143.00
9	Total					

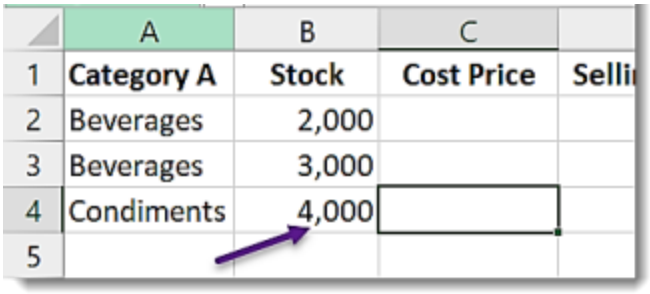
You can add a thousand separators on numbers to make them readable.



Adding decimal places might not be necessary, so the value in the box is set to zero.

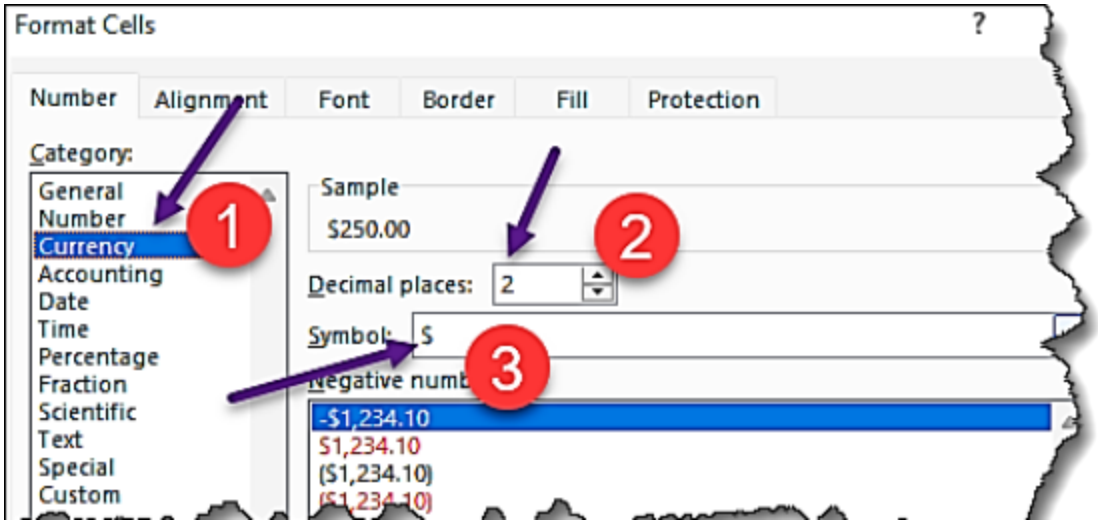


When done, you click the **OK** button.

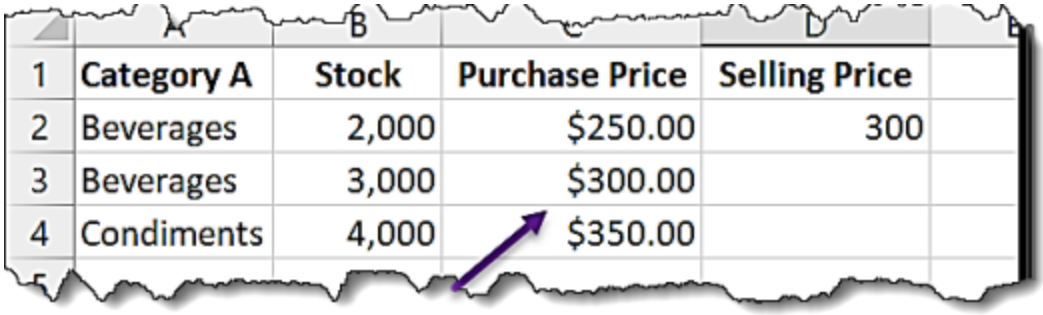


	A	B	C	
1	Category A	Stock	Cost Price	Selli
2	Beverages	2,000		
3	Beverages	3,000		
4	Condiments	4,000		
5				

For the "**Currency**" category, numbers appear in currency values.



You add decimal places to indicate the lower denomination of the currency symbol of your choice.



	A	B	C	D
1	Category A	Stock	Purchase Price	Selling Price
2	Beverages	2,000	$250.00	300
3	Beverages	3,000	$300.00	
4	Condiments	4,000	$350.00	

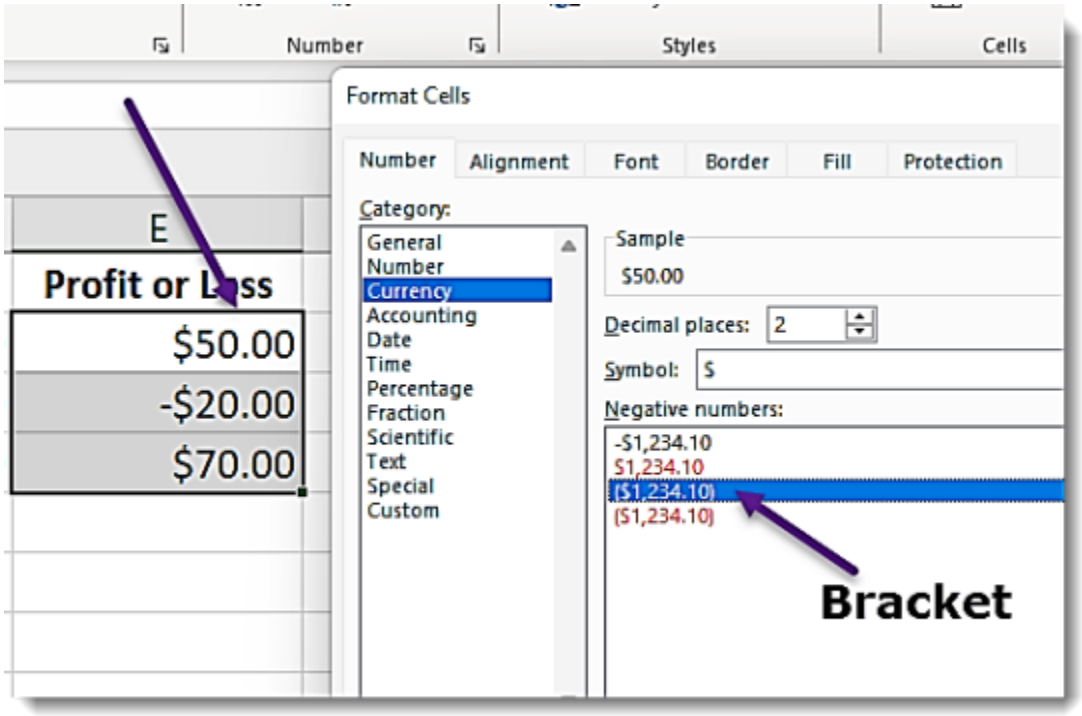
Using parentheses is one of the most common ways accountants increase the readability of a **negative** number in their reports.



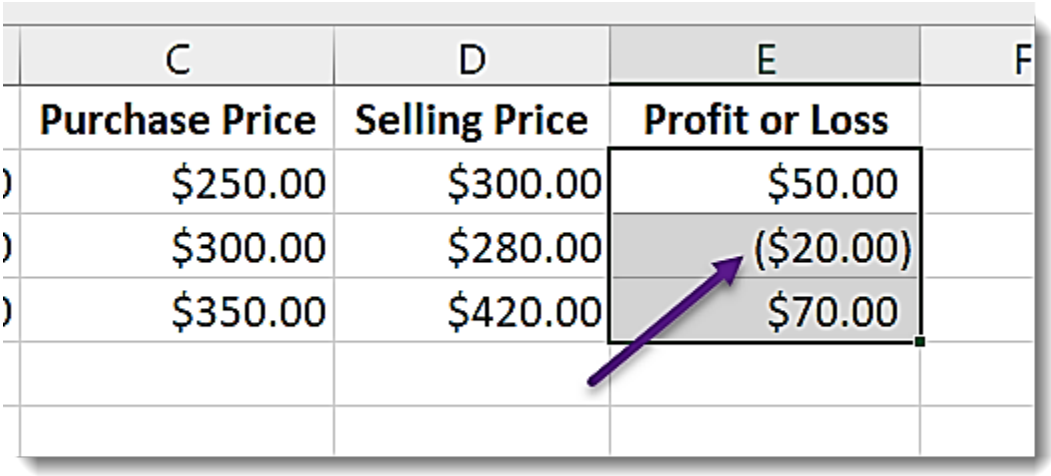
	A	B	C	D	E	F
1	**Category A**	**Stock**	**Purchase Price**	**Selling Price**	**Profit or Loss**	
2	Beverages	2,000	$250.00	$300.00	$50.00	
3	Beverages	3,000	$300.00	$280.00	-$20.00	
4	Condiments	4,000	$350.00	$420.00	$70.00	
5						

To express the negative values in a standard way, you can put parentheses around them.

The "**Negative numbers**" list allows you to select a format from a list of format options if you wish to format negative numbers differently by choosing the list.



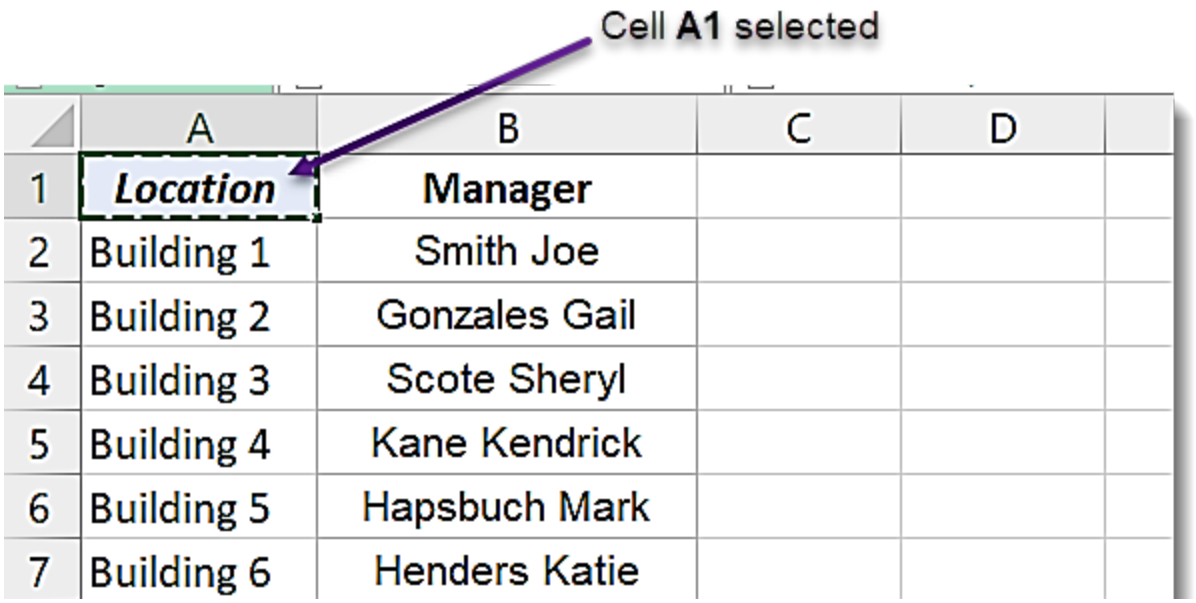
When you have finished formatting the number, click the **OK** button to apply the formatting.



FORMAT PAINTER

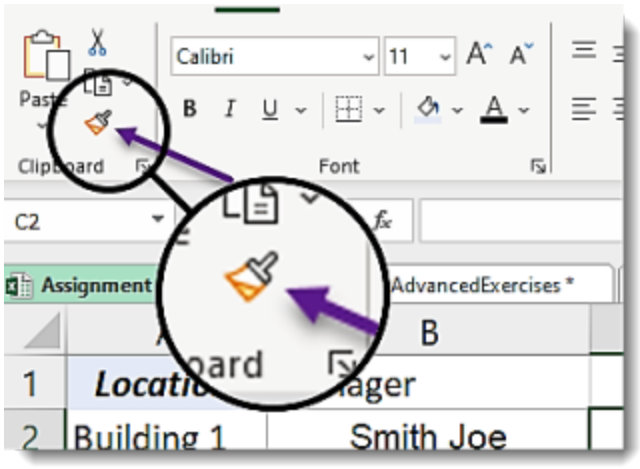
You can quickly copy the formatting of one cell or range of cells in a worksheet and apply it to another cell or range of cells within the same worksheet with the help of a tool called Format Painter.

To begin using the Format Painter, select a cell or range of cells containing the formatting you wish to copy.

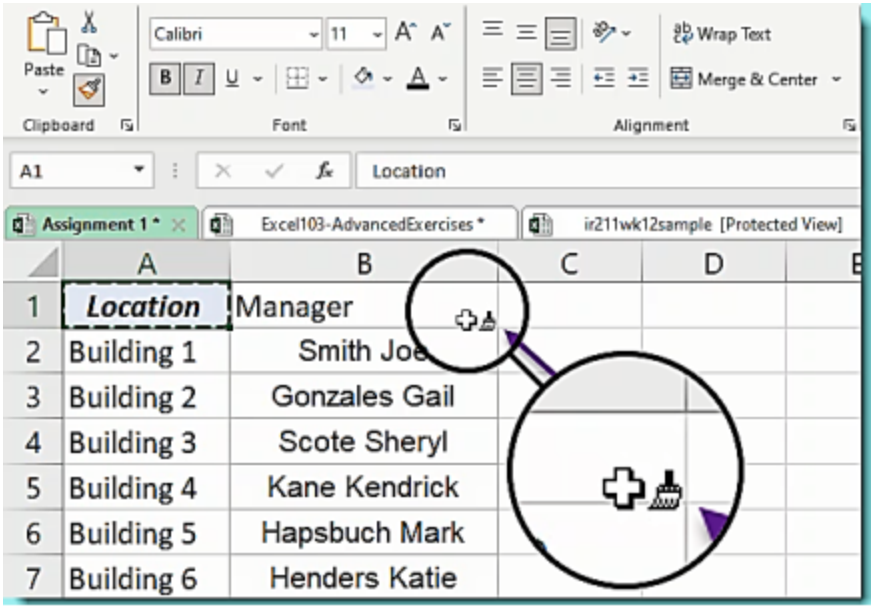


	A	B	C	D
1	***Location***	**Manager**		
2	Building 1	Smith Joe		
3	Building 2	Gonzales Gail		
4	Building 3	Scote Sheryl		
5	Building 4	Kane Kendrick		
6	Building 5	Hapsbuch Mark		
7	Building 6	Henders Katie		

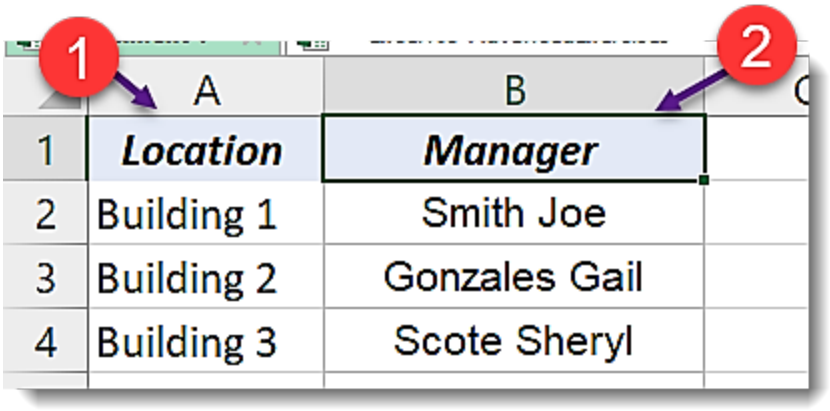
The content in cell **A1** has a background fill, and the text is italicized, boldfaced, and aligned to the center. Click the **Format Painter** button in the **Clipboard** group on the left side of the **Home tab**.



A paintbrush icon will appear in place of the mouse pointer.



Click on the selected cell or click and drag on the range of cells where you want to apply the formatting.



Double-click the Format Painter button to apply formatting to multiple cells or a range of cells rather than clicking and dragging. This will enable you to apply formatting to multiple cells or a range of cells without reactivating the Format Painter each time. Press the **Esc** key or click the Format Painter button again if you wish to turn off the Format Painter.

LESSON 5

MODIFYING AN EXCEL WORKSHEET

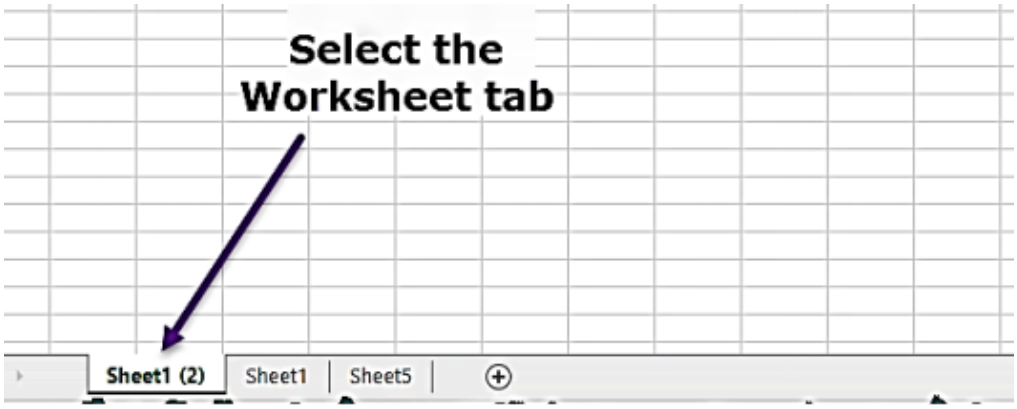
MOVING AND COPYING AN EXCEL WORKSHEET

Worksheets in Excel can be moved or copied for purposes such as rearranging the order of the worksheets within a workbook or using a copied worksheet as a template for a new worksheet with similar data.

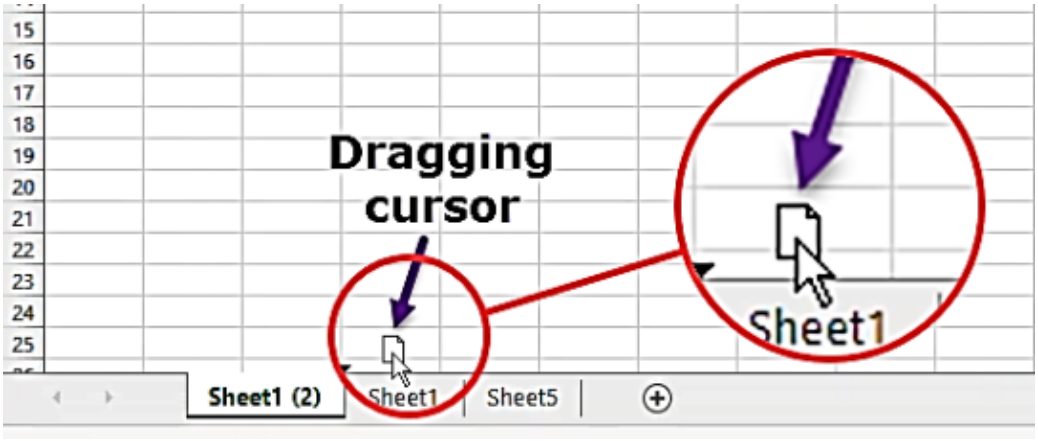
An Excel worksheet can be moved or copied in several ways, including using your **mouse**, the **Home** tab ribbon, and **shortcut** keys.

How to move a worksheet with the mouse:

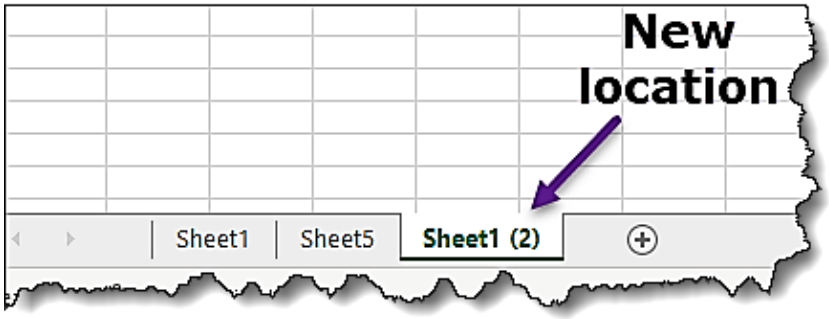
1. Go to the worksheet you wish to relocate and click on its tab.



1. Click and hold the worksheet tab, drag it to its new location in the same workbook, and release the mouse button when you are on the spot

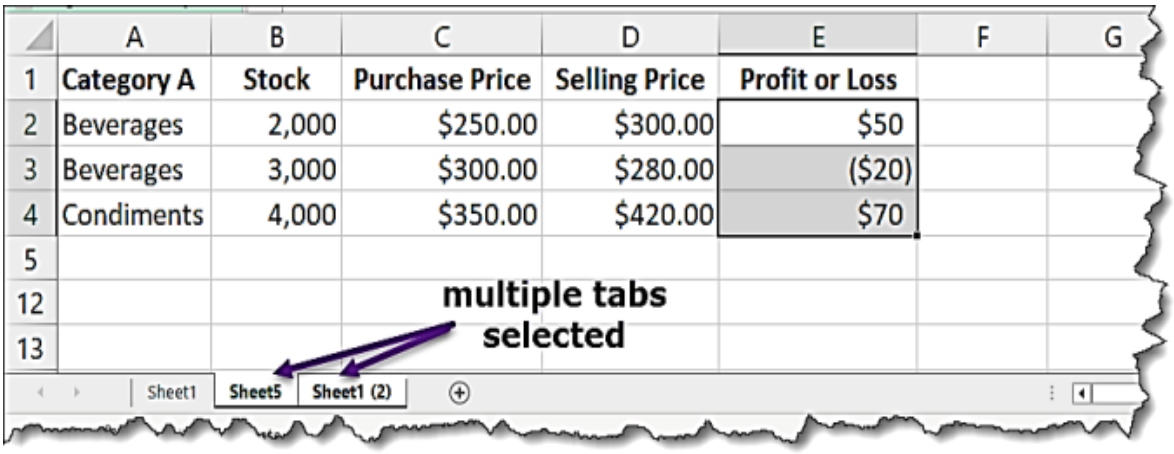


The worksheet now appears in a new location after dragging and dropping.



The drag-and-drop method can move more than one selected worksheet to a new location.

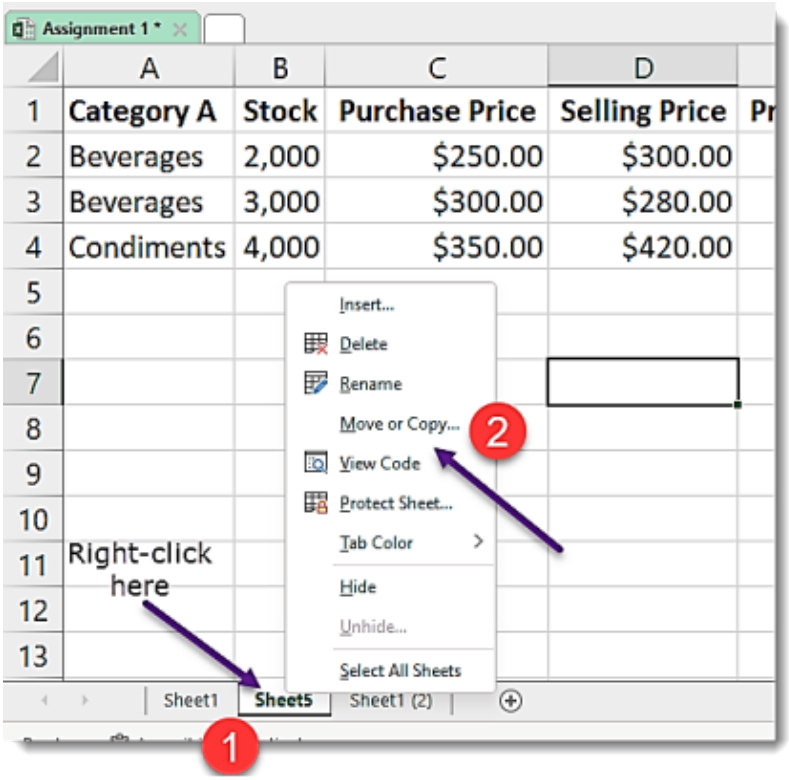
Hold down the **Ctrl** key and click on the tabs of the worksheets you want to select to make a multi-selection.



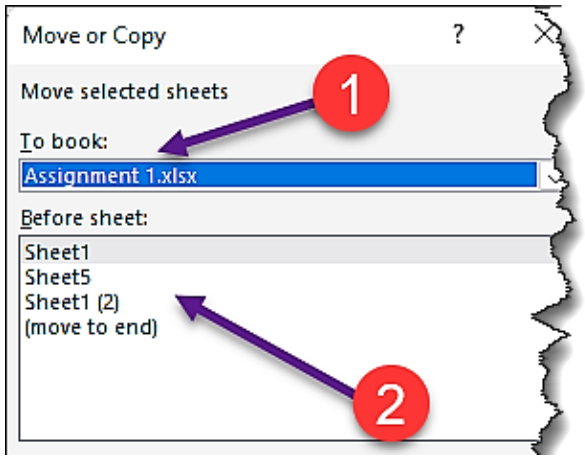
Next, you click and drag the mouse toward the new location to move the selected worksheets and release the mouse button when done.

If you would like to copy a worksheet using the mouse, follow these steps:

1. Select the worksheet **tab** you want to **copy** and right-click on it.

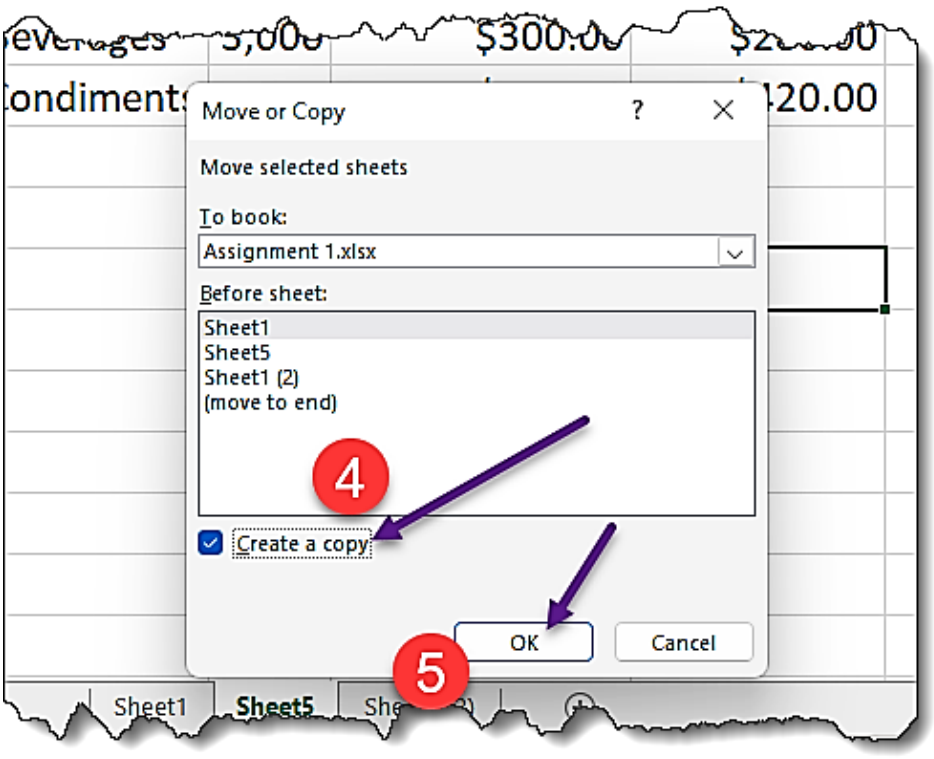


1. Choose "**Move or Copy**" from the menu.
2. In the "**Move or Copy**" dialog box that appears on your screen, select the target workbook (**To book**) and the location (**Before sheet**) at which you wish to insert the copied worksheet.



The **To Book** dro-list allows you to select a different workbook that must have been opened and running. Else by default, your current workbook is chosen already.

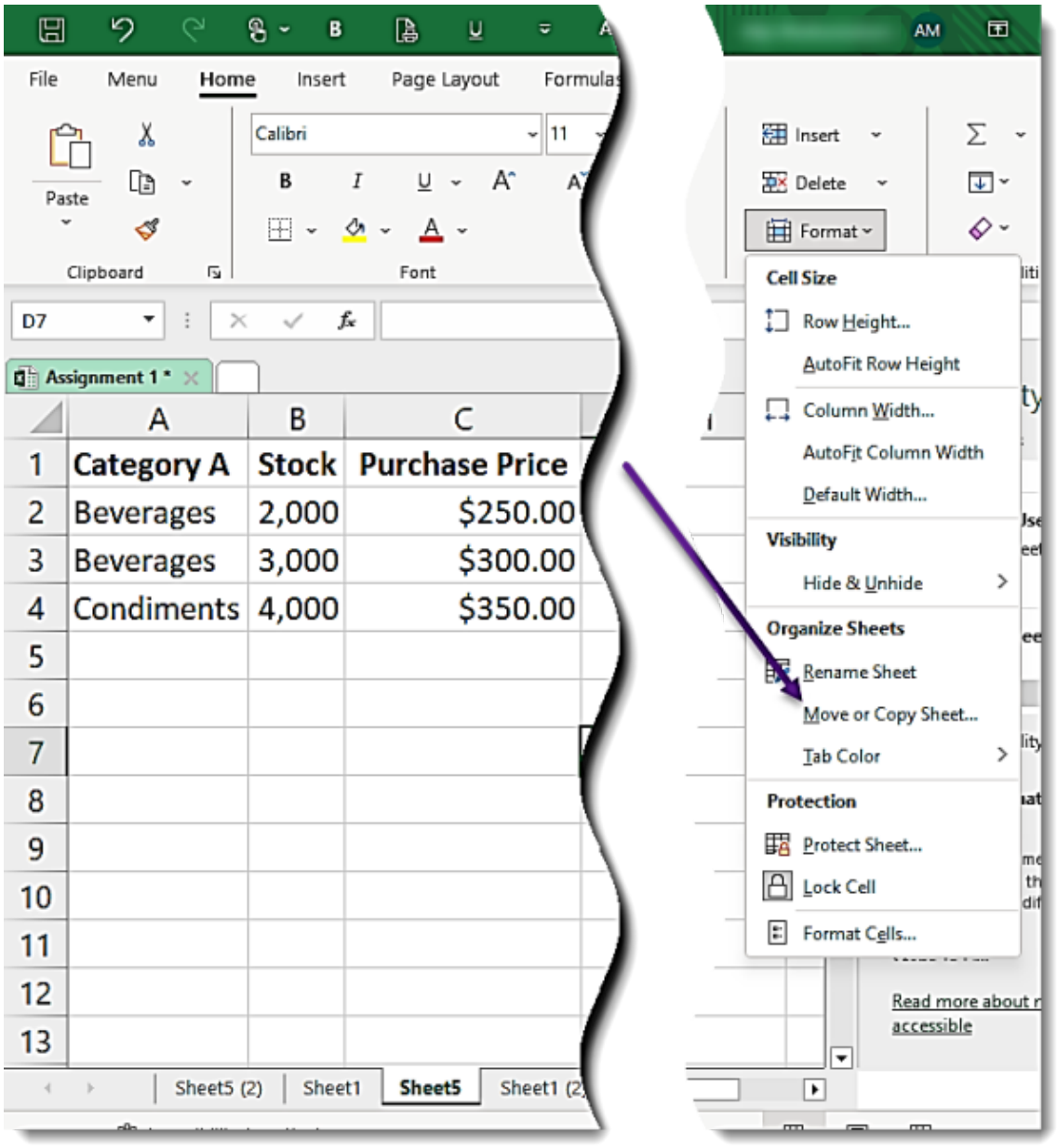
1. Check the "**Create a copy**" box to create a copy of the worksheet.



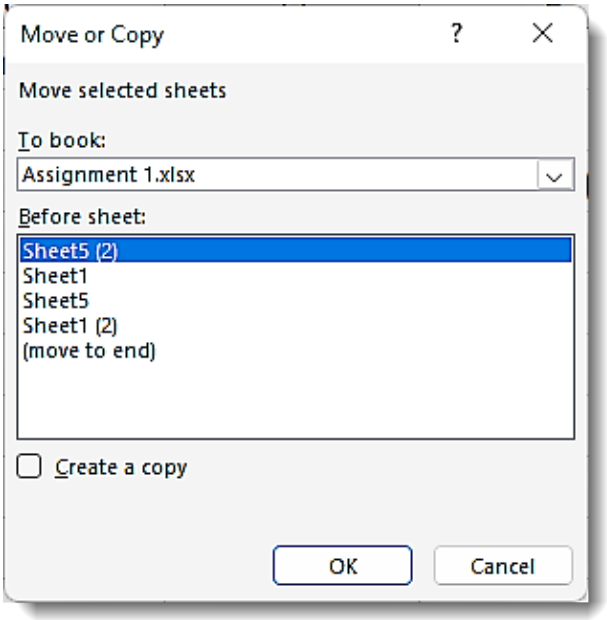
1. Click the "**OK**" button to copy the worksheet.

Using the ribbon, you can move or copy a worksheet

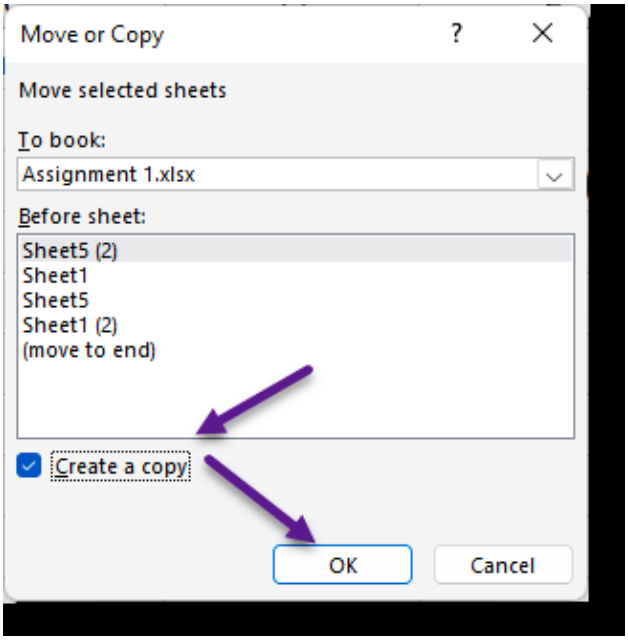
1. To move or copy a worksheet in Excel, you must open the workbook containing the worksheet you want to move or copy.
2. After that, you must click on the worksheet tab on the worksheet you want to relocate or copy.
3. Go to the **Home** tab on the ribbon and click the **Format** button in the **Cells** group on the left side of your screen. In the drop-down menu, click on **Move** or **Copy Sheet**.



1. In the **Move or Copy** dialog box that appears, select the workbook to which you wish to move the copied or transferred worksheet from the **To book** drop-down list, and choose the worksheet before which you want to insert the copied or moved worksheet from the **Before sheet** drop-down list.

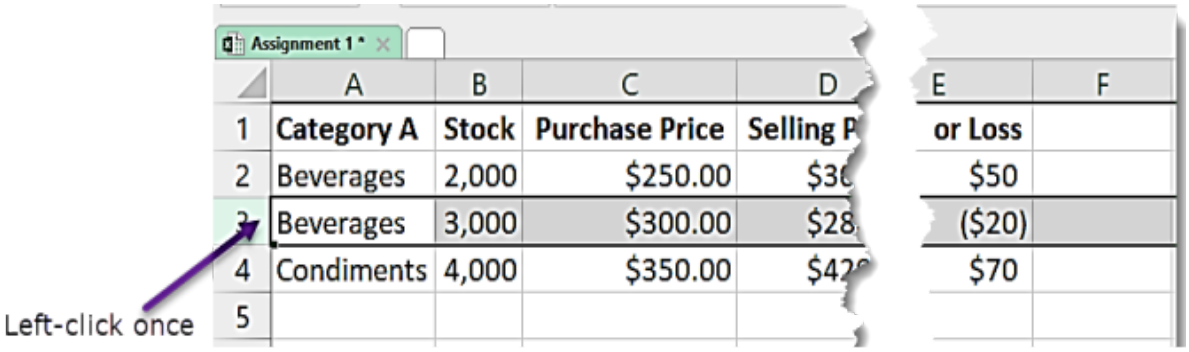


1. Alternatively, to **Create a copy** of the worksheet while moving it, check the **Create a copy** checkbox.
2. The final step is to click the **OK** button to complete the process.



INSERTING AND DELETING ROWS AND COLUMNS

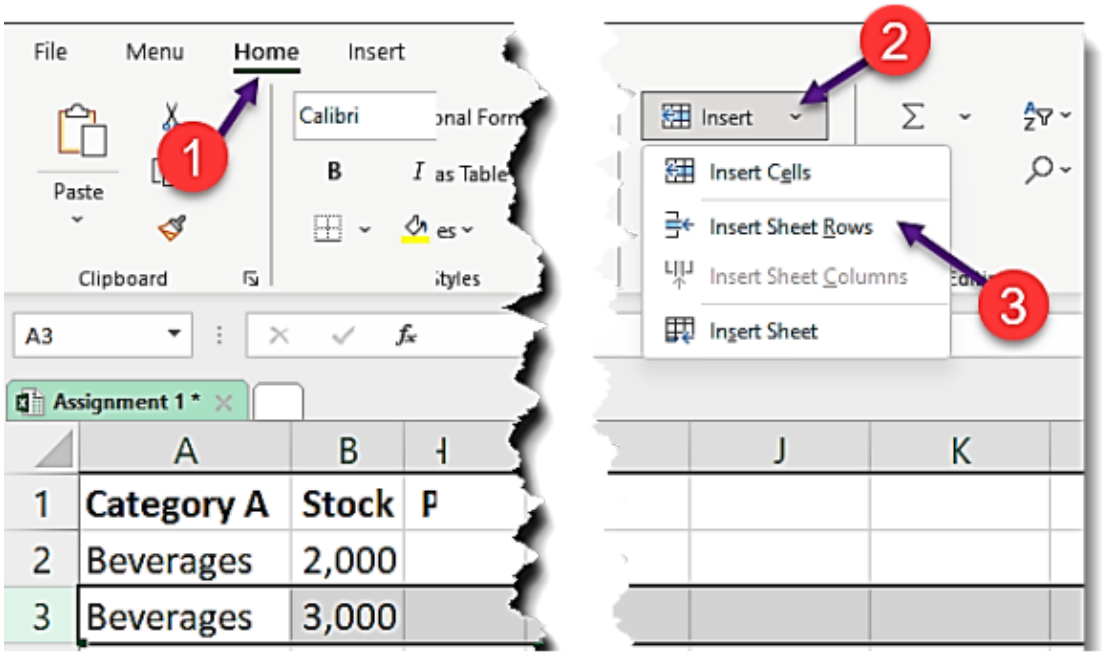
The Excel ribbon method is one of three methods to insert rows or columns in a worksheet. The first thing you need to do when you want to add new rows in an Excel worksheet is to highlight the row or rows above or below where you want to add the new rows.



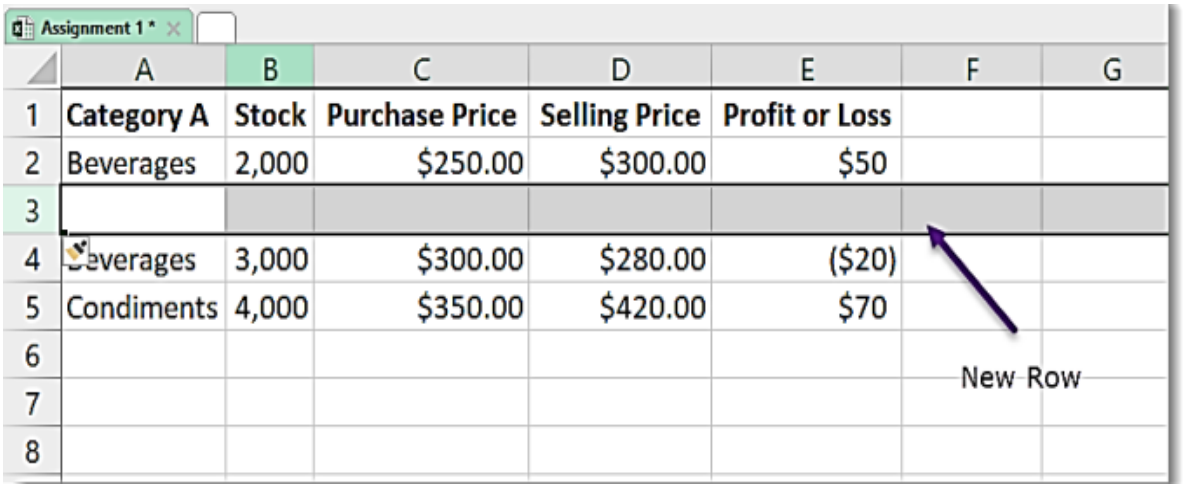
You can select multiple rows by clicking and dragging the mouse over the row numbers or use the arrow keys to select multiple rows by holding the shift key while clicking and dragging the mouse over the row numbers.

On the Home tab, click the **Insert** button under the **Cells** group.

Choose the **Insert Sheet Rows** option from the drop-down menu that appears.

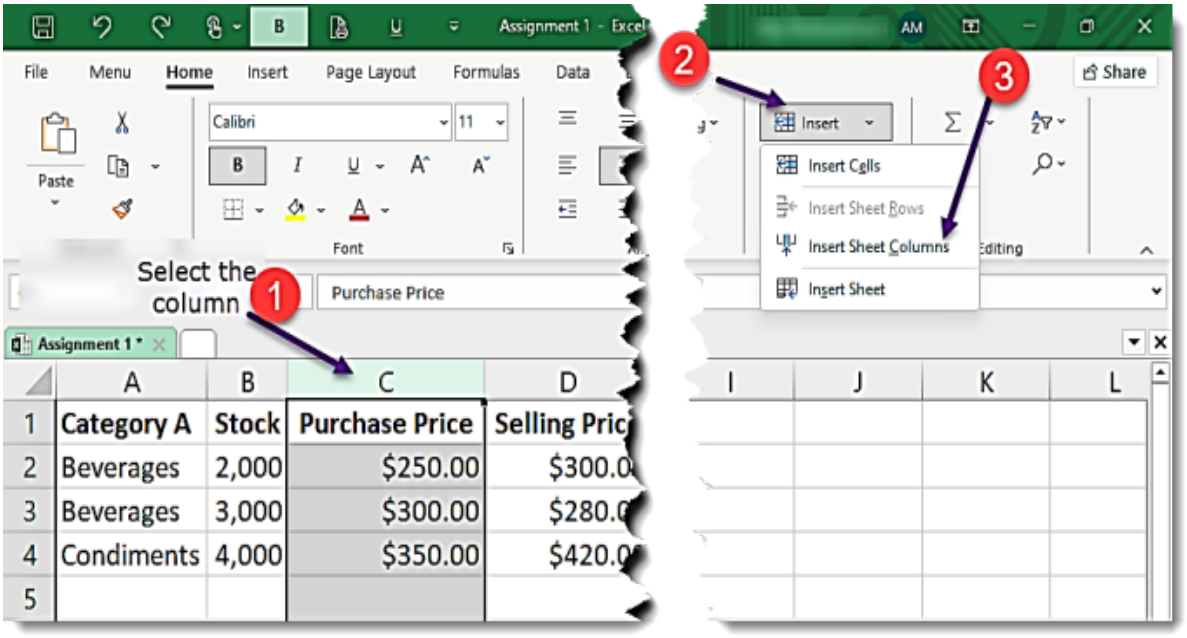


A new row (s) will appear above the selected row (s), depending on the number of rows you highlighted.



If you selected two rows, once you click the **Insert Sheet Rows**, two more rows will be inserted above them.

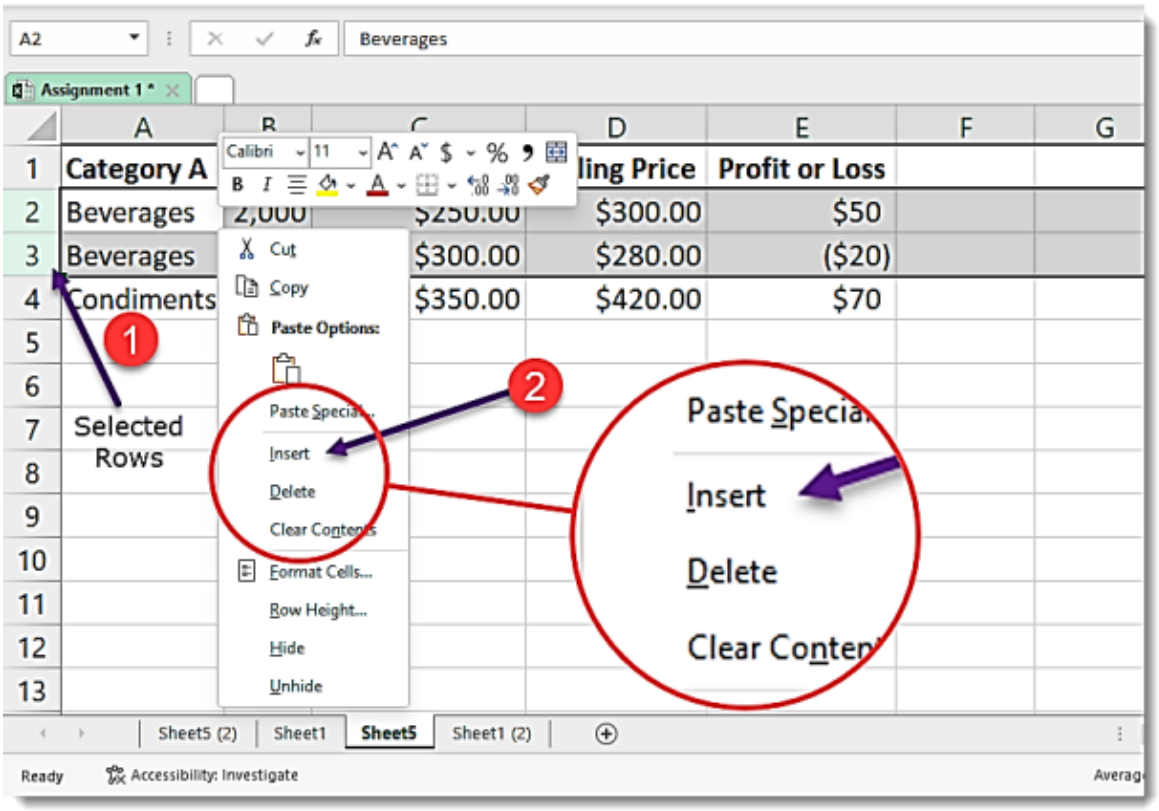
The same approach works to insert new columns in a worksheet. However, in the **Insert** drop-down menu on the **Home** tab, you select **Insert Sheet Column.**



Using the Mouse Method

Another method you can use to insert rows or columns is by using the mouse method. After selecting the row(s) or column(s), right-click on the selected row or column.

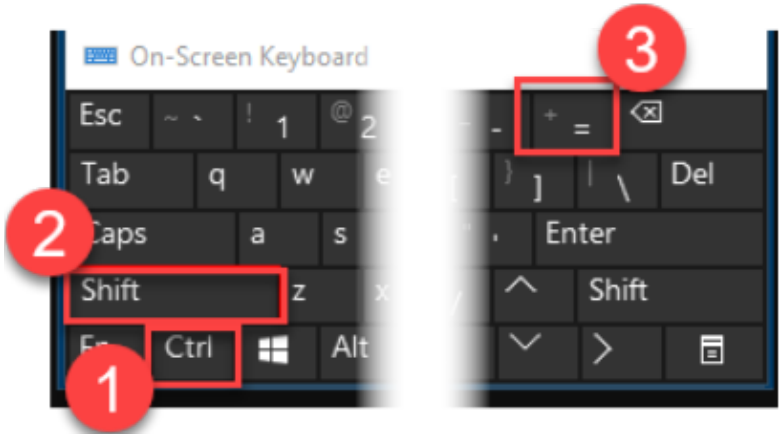
Next, select **Insert** from the menu.



Excel will insert a new row(s) immediately, but if your selection is on a column, Excel will insert a new set of column (s) as well.

	A	B	C	D	E	F	G
1	**Category A**	**Stock**	**Purchase Price**	**Selling Price**	**Profit or Loss**		
2							
3							
4	Beverages	2,000	$250.00	$300.00	$50		
5	Beverages	3,000	$300.00	$280.00	($20)		
6	Condiments	4,000	$350.00	$420.00	$70		
7							
8						Add text	
9							
10							

The keyboard shortcut keys are **Ctrl** + **Shift**+ =

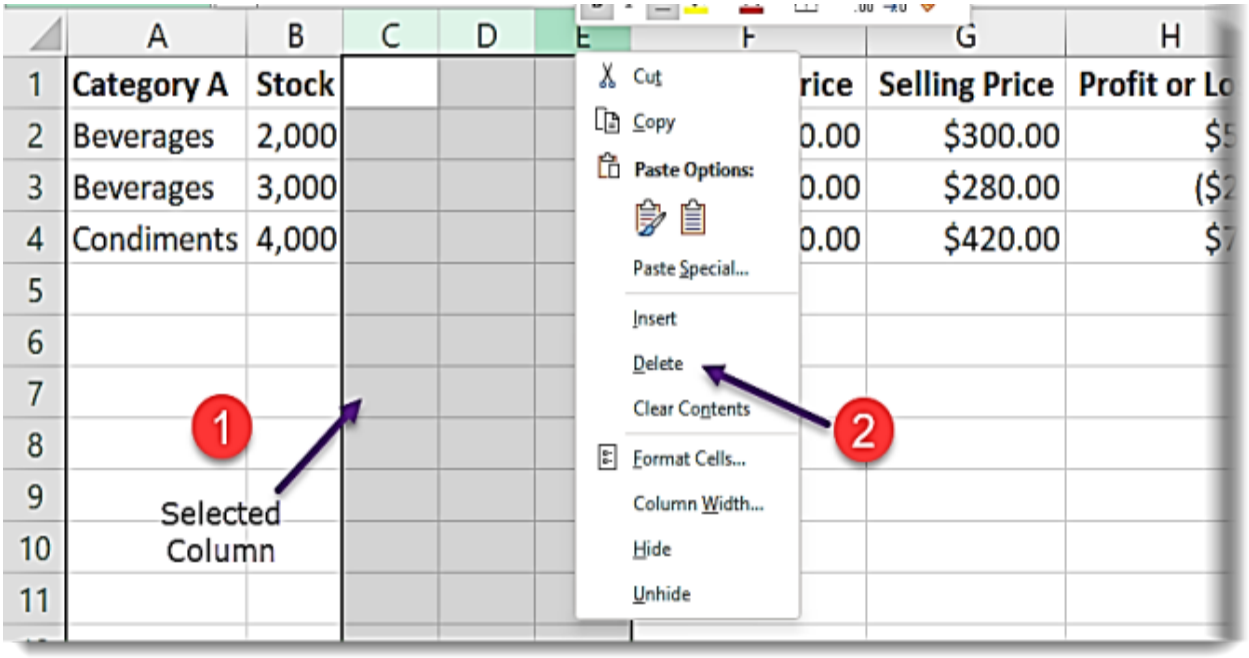


Before using the shortcut keys, highlight the row (s) or column (s) to guide Excel on what to insert specifically on a worksheet.

DELETING ROW(S) AND COLUMN(S) IN A WORKSHEET

Follow these steps to remove a row(s) or column(s) from a Worksheet:

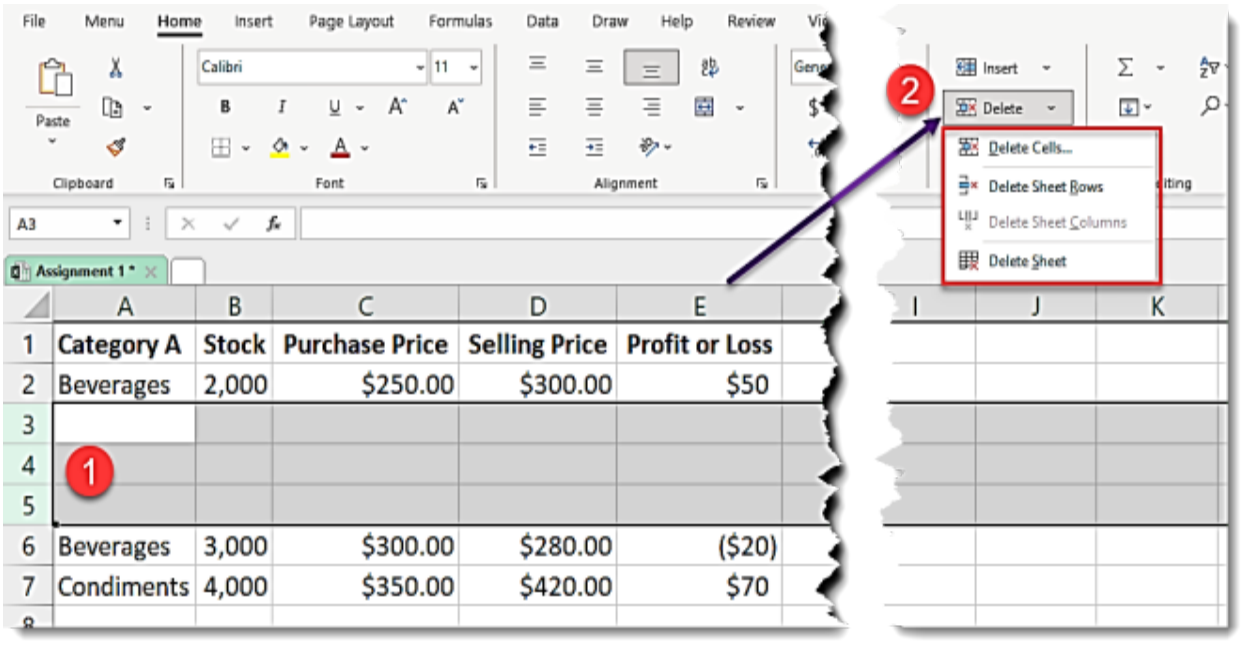
1. Click on the row headings or column headings you wish to delete in the table. Holding the "**Ctrl**" key while clicking on the desired headers will allow you to select multiple rows or columns simultaneously.
2. Right-click on the selected rows or columns and then select "**Delete**" from the menu.



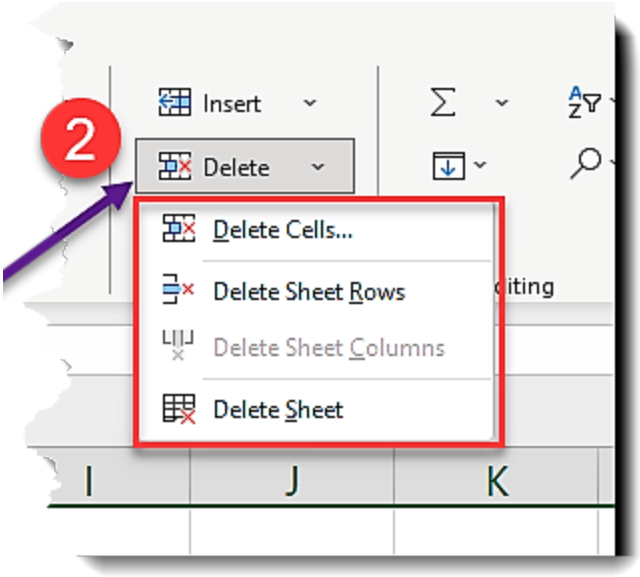
This will delete the selected row or column.

However, you can use the **Home** tab to delete selected row(s) or column(s).

Go to the **Delete** command on the **Cells** group.

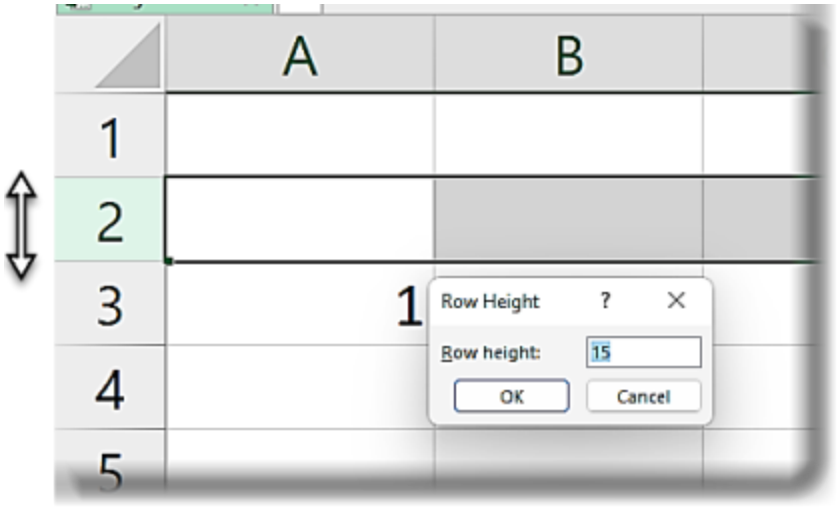


With the "**Delete**" drop-down menu, you can delete an entire row or column or specific cells within a row or column.

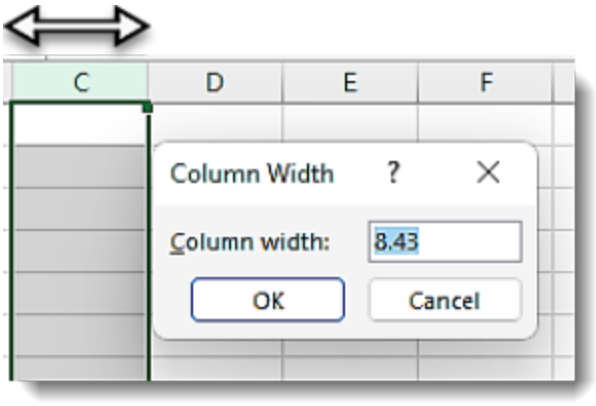


CHANGING THE WIDTH AND HEIGHT OF A CELL

As discussed earlier in **Lesson 3** of the book, Excel has a default row height of 15 points,



While the default column width is 8.43 points.



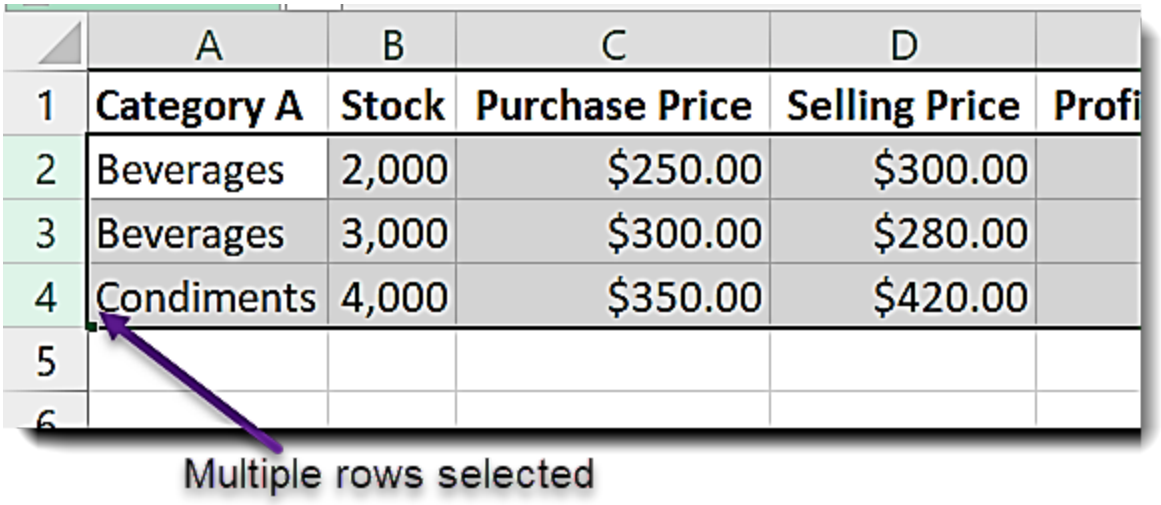
The default row height or column width is determined using the default font size of 11 points and adding some extra spacing between the contents of the

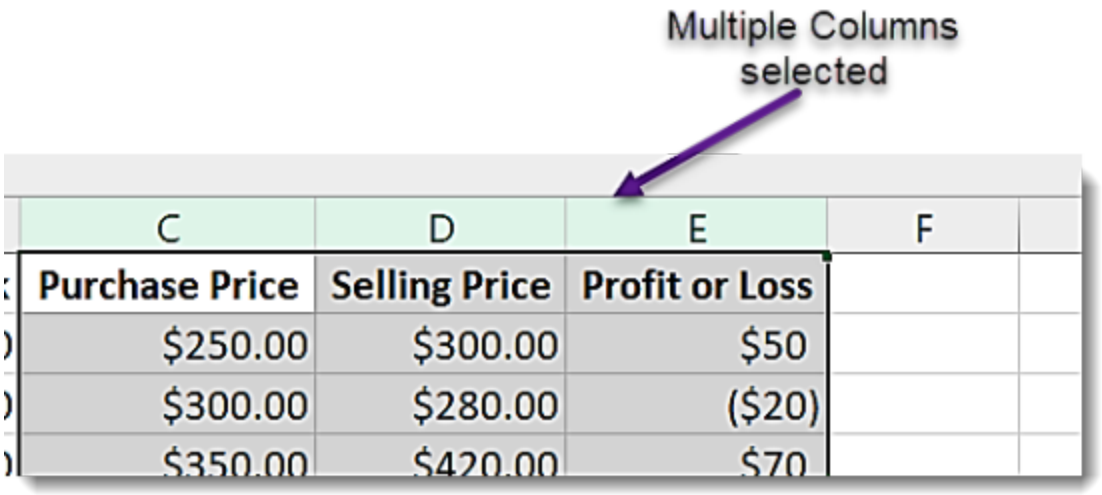
cells.

An Excel worksheet automatically assigns all new rows or columns the default row height or column width and does not affect the height or width of existing rows or columns.

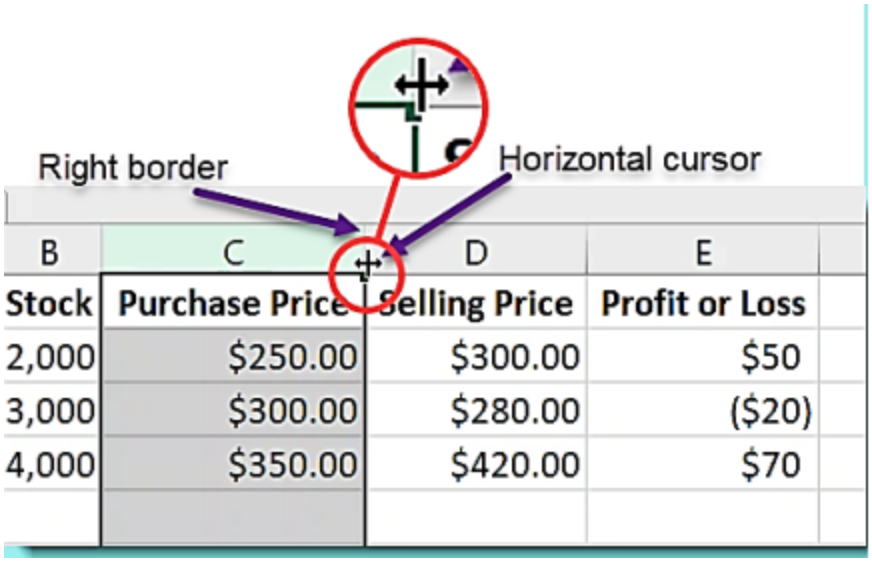
Here are the steps to follow to change the width or height of the cells in an Excel worksheet:

1. Choose the cells whose row width or column height you want to change and click on them. Holding down the "**Ctrl**" key while clicking on the cells will allow you to select multiple cells simultaneously.



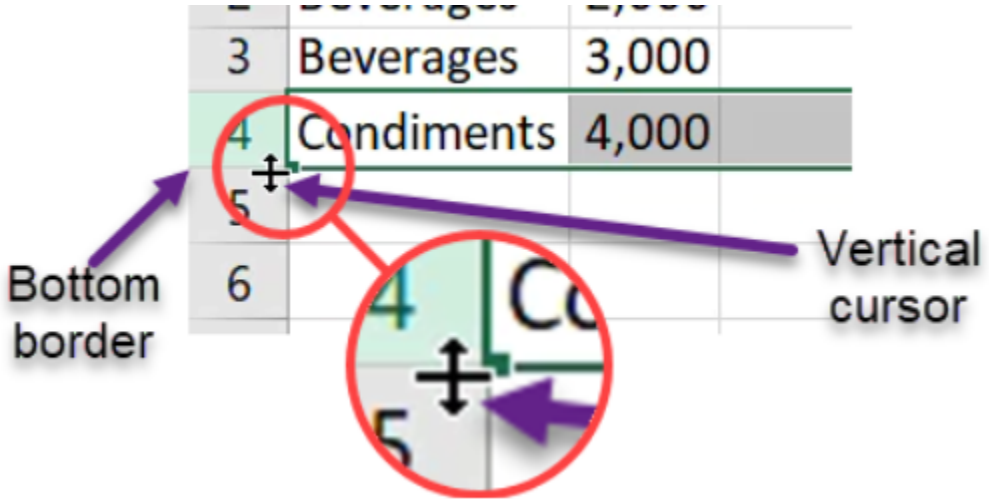


1. **If a single column is selected**, move the mouse cursor toward the **right border** of the selected column to change the cells' width.



A horizontal resize cursor will replace your default cursor shape.

For row height, after making your row selection, move the cursor to the **bottom border**, and the cursor shape will turn into a vertical resize cursor.

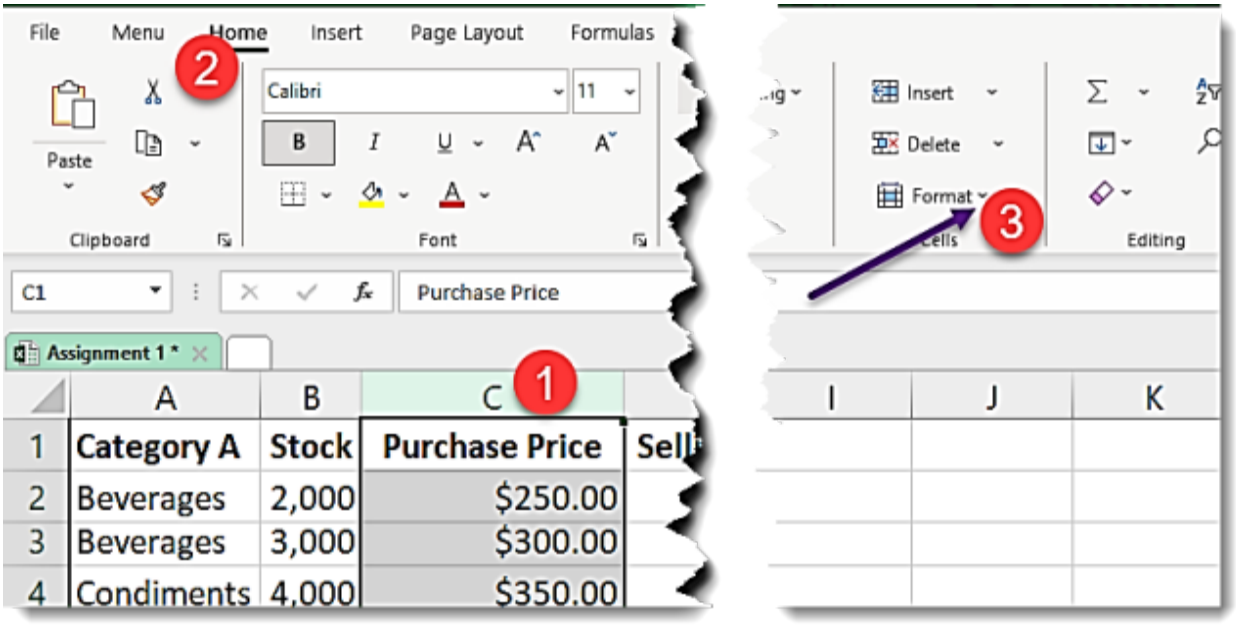


Using the left mouse button, click and hold down the button, and then drag the border of the cells to the **left** or **right** to adjust the **column width**.

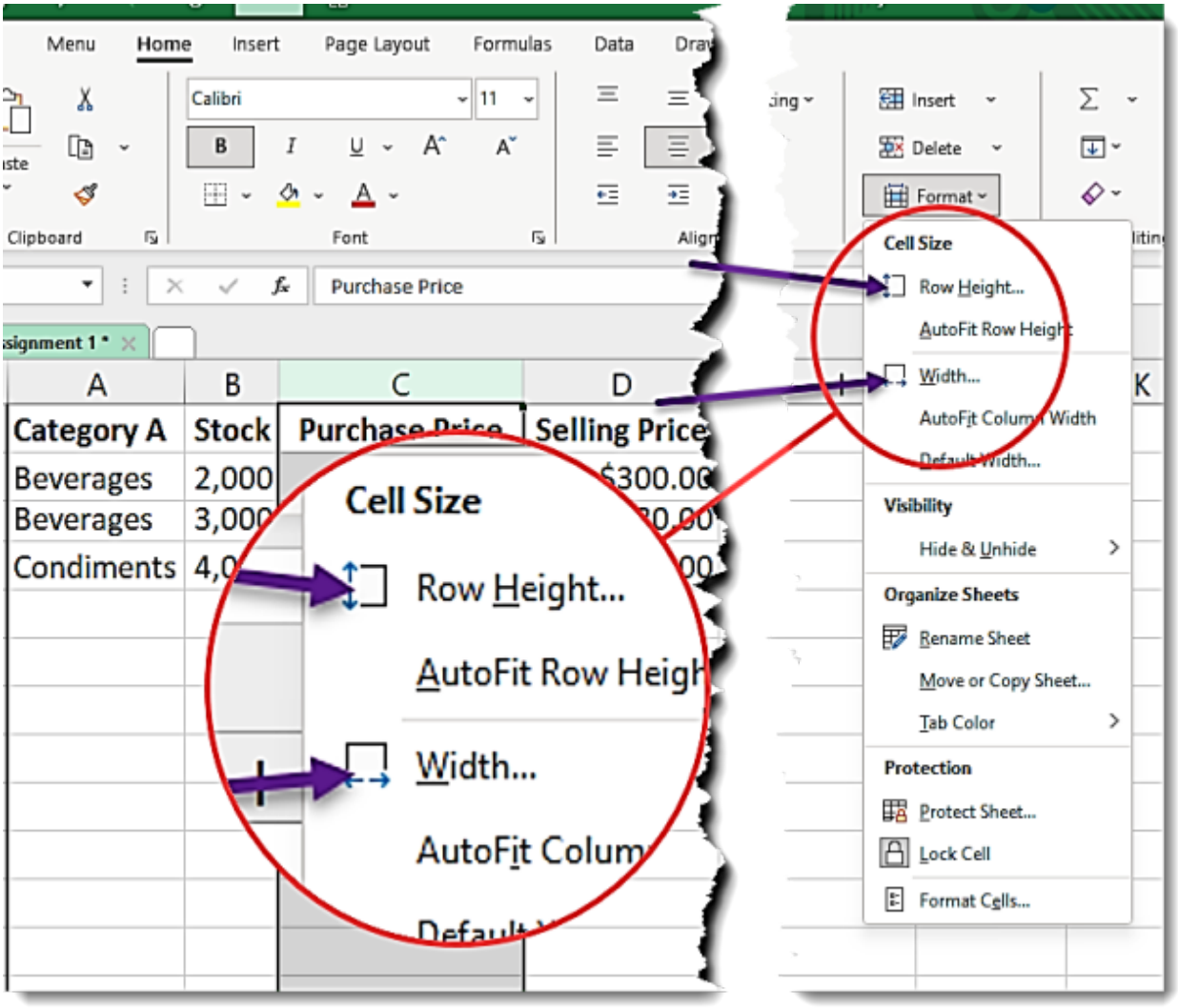
Move the **vertical resize cursor** up or down to adjust the **row height**.

Then again, you can alter selected cells' column width and row height by going to the **Home** tab and clicking the **Format** command in the **Cells** group on the Excel ribbon.

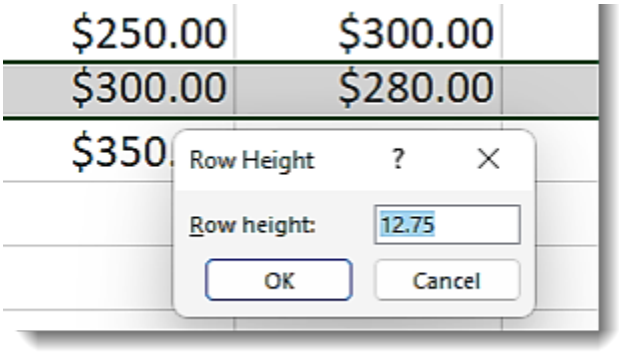
1. Select the cells whose row width or column height you want to change.
2. Click the **Home** tab and then click on the **Format** command in the **Cells** group.

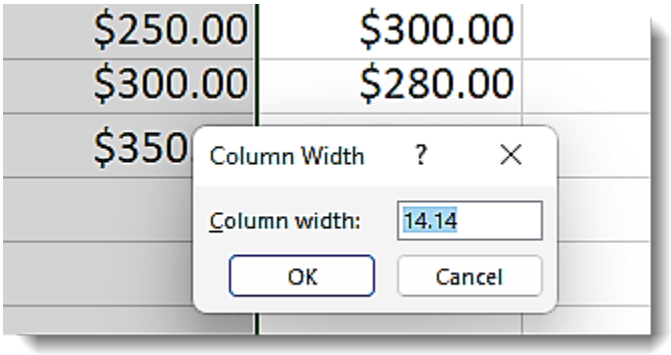


1. Click on the Column Width or the Row Height option in the Format drop-down menu.



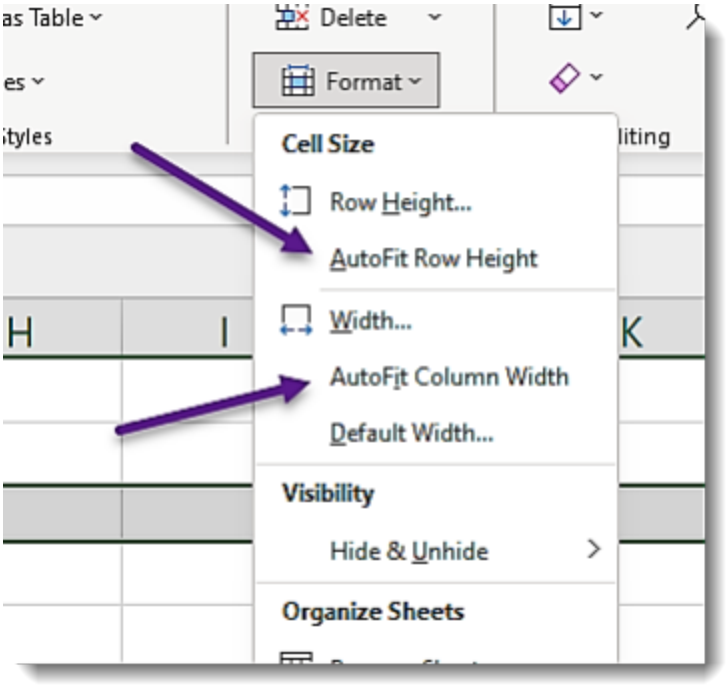
1. Enter the desired column width or row height in the box, then click the **OK button** to apply the changes.





You can also adjust the column width and row height of cells using the AutoFit feature discussed in **Lesson 3**.

Select the cells you want to modify, then click either the **AutoFit Column Width** or **AutoFit Row Height** option in the **Format** command drop-down menu.



This will automatically resize the selected cells to fit the contents inside them.

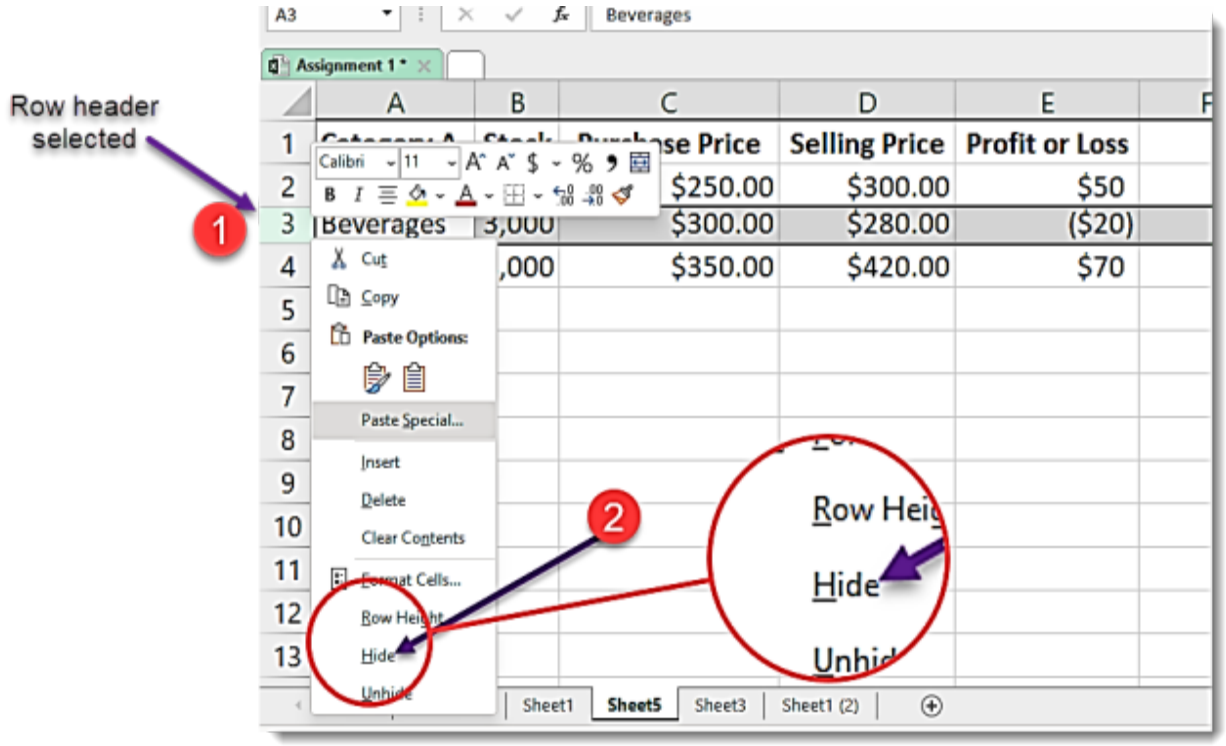
HIDING AND UNHIDING EXCEL ROWS AND COLUMNS

You may use the **Hide** feature in the ribbon to conceal specific row(s) or column(s) in Excel. This will render the selected row(s) or column(s) invisible to anyone viewing the worksheet. This tool is handy when dealing with large spreadsheets. It allows you to concentrate on a specific data set or temporarily mask particular row(s) or column(s) without completely deleting them from view.

If you want to **unhide** hidden row(s) or column(s), you can use the **Unhide** feature to make them visible again. The contents of the row(s) or column(s) will now be accessible; you can see and reaccess them.

Follow these steps to hide rows or columns in an Excel spreadsheet

1. Select the rows or columns you want to hide by clicking and dragging the mouse cursor over the row or column headings.
2. Right-click one of the selected rows or columns, and select **Hide** from the context menu.

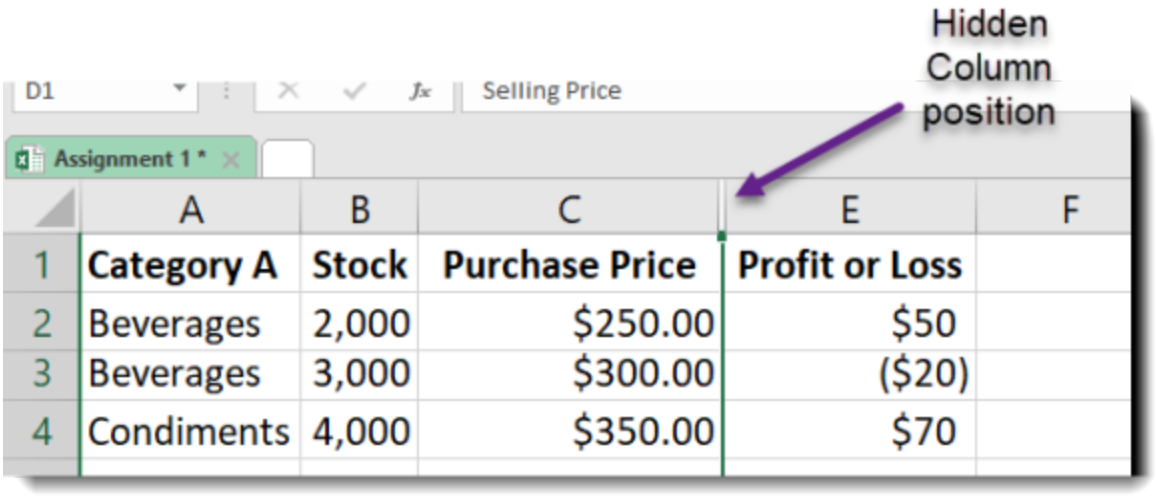


Once you click on **Hide**, the selected row or column will immediately hide on your screen.

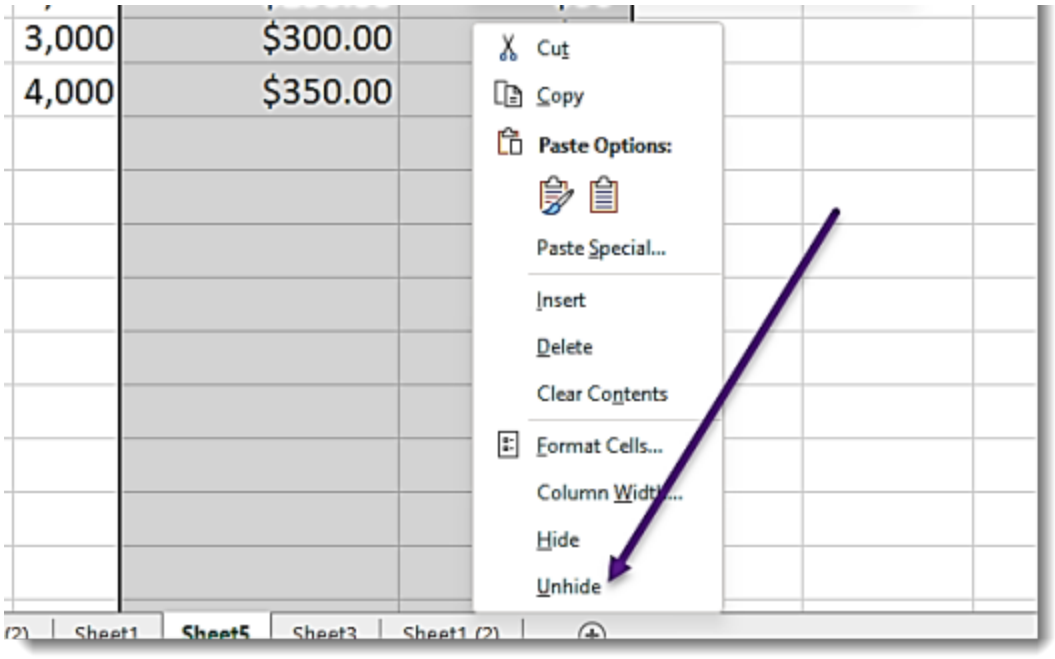
To unhide row(s) or column(s), follow these steps:

1. Select the row(s) or column(s) around the hidden rows or columns.

For example, if **column D** is hidden, you must select columns **C** and **E**.



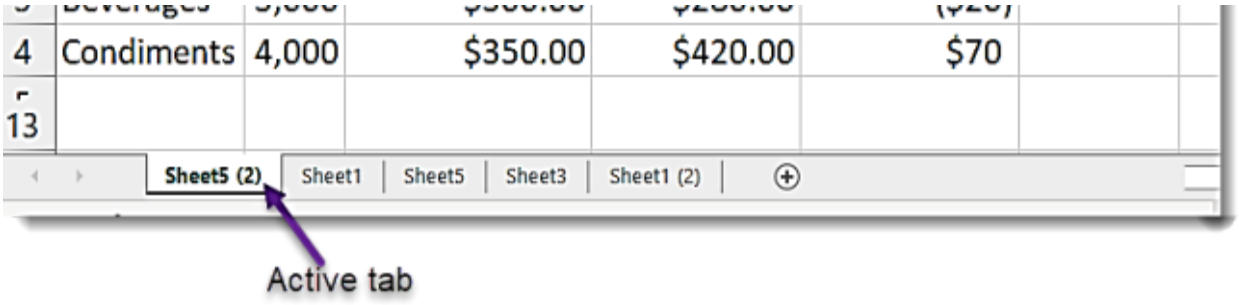
1. Right-click any selected rows or columns, and click on **Unhide** from the context menu.



Excel will unhide the row(s) or column(s), and you can reaccess their contents.

RENAMING AN EXCEL WORKSHEET

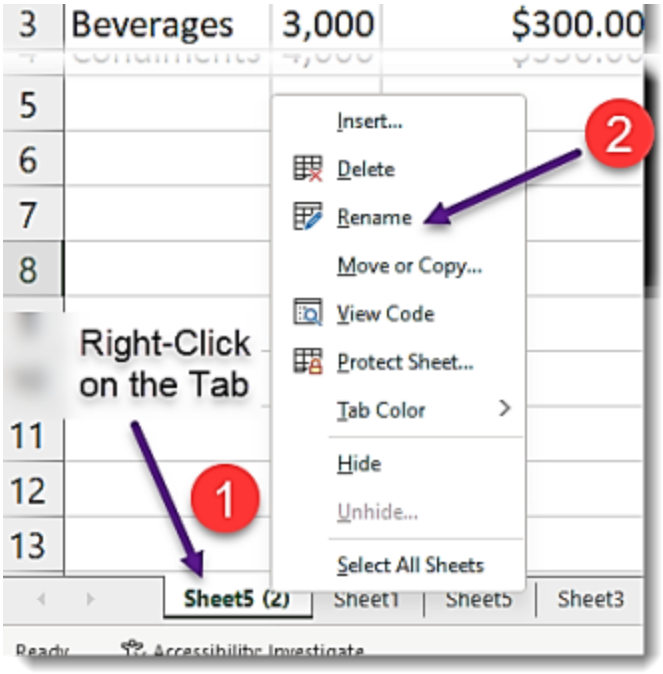
The edit tab at the bottom of an Excel workbook can be used to rename its worksheets. Each worksheet has a unique **tab** for easy navigation.



Renaming improves organization and clarity, making locating and referencing specific worksheets in a workbook easier. This is particularly useful for large or complex workbooks with multiple sheets containing related data or calculations.

In Excel, every worksheet has a name assigned by default, such as **Sheet1**, **Sheet2**, etc. It is, however, possible to rename a worksheet to something more meaningful or descriptive. Doing so will allow you to find the worksheet you are looking for more easily. For instance, if you have multiple worksheets in the same workbook, you may wish to give them names that reflect their contents or objectives.

To change the name of a worksheet, **right-click** on the worksheet tab and select the **Rename** option from the context menu.



Enter the new name and then press the **Enter** key when done.



Alternatively, you can double-click the worksheet tab, type in a new name for the worksheet, and then press the **Enter** key to save the changes.

DELETING AN EXCEL WORKSHEET

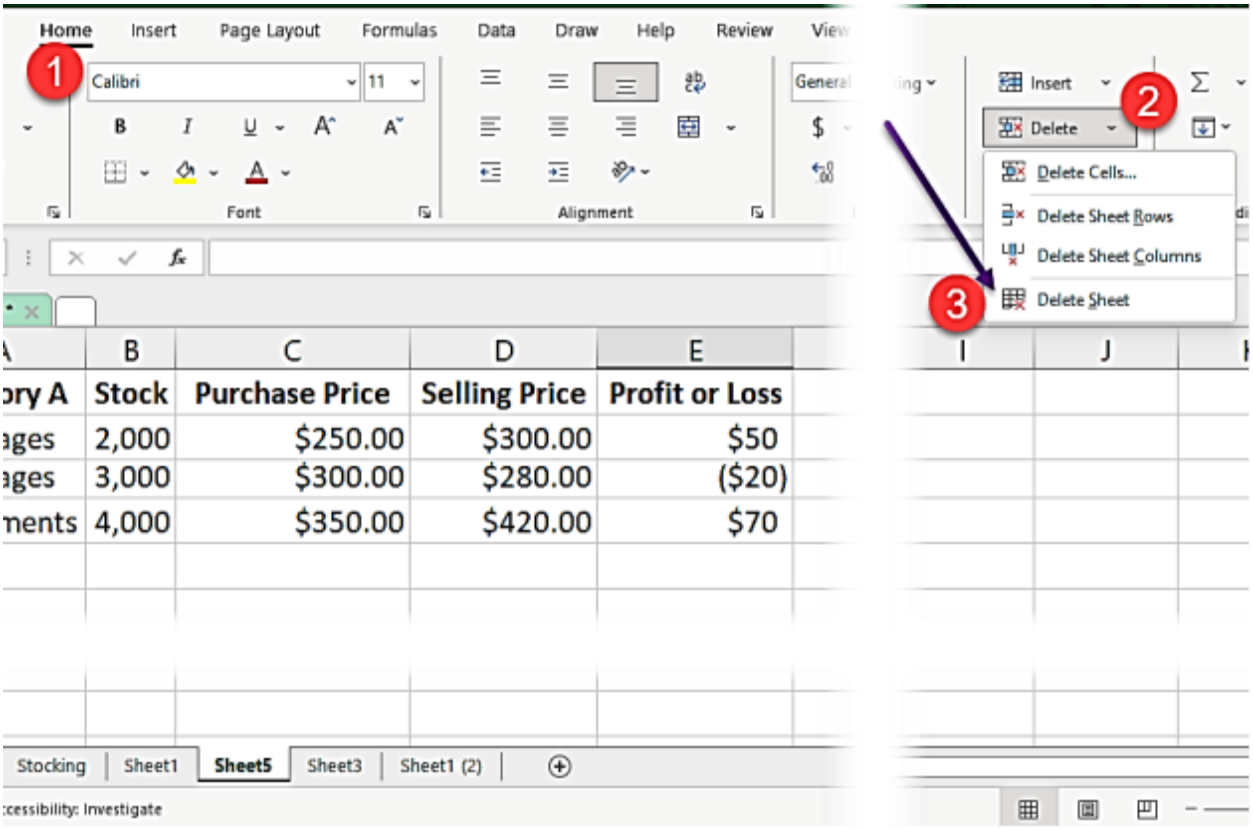
If you delete a worksheet, it is a permanent action and cannot be undone. It is essential to keep this in mind while you do so.

If you accidentally delete a worksheet and the data you entered in it is lost, you can recover it using the **Undo** or **Ctrl+Z** shortcut key immediately. But if you save and close the workbook, you can't recover the worksheet; you will need to create a new worksheet and enter the data again.

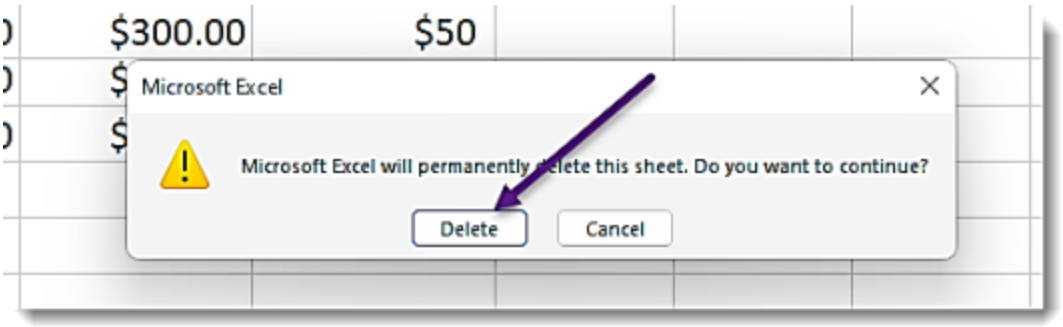
A worksheet can't be deleted if it is the only worksheet left in the workbook. You will have to create a new worksheet before the old one can be deleted.

Follow these steps to delete an Excel worksheet:

1. Make sure the workbook you want to delete is open.
2. Select the tab for the worksheet you wish to delete from the list of worksheets.
3. Click on the **Home** tab on the Excel ribbon.
4. Click on the **Delete** command in the **Cells** group.
5. Select **Delete Sheet** from the drop-down menu that appears.



A warning message will appear, so click on the **Delete** button to confirm you want to delete the selected worksheet.



LESSON 6

INTRODUCTION TO FORMULAS IN EXCEL

WHAT ARE FORMULAS IN EXCEL, AND WHAT ARE THEIR PURPOSES?

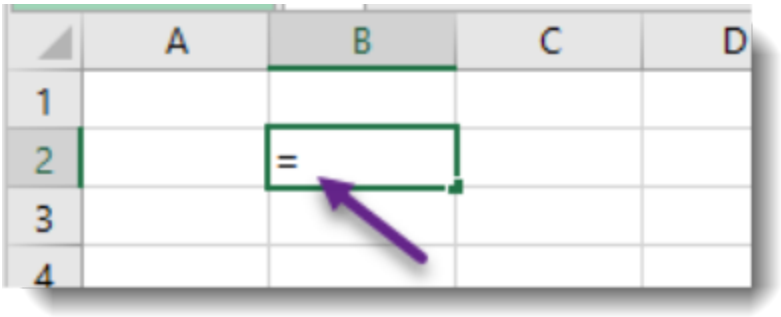
Formulas are an integral part of using Excel effectively in your work. The term formula is used in Excel to describe a set of instructions used to instruct Excel to calculate or retrieve data from a worksheet.

An Excel formula automates calculations and simplifies working with data in a worksheet.

Excel's equations use the following standard operators;

- Plus sign + for addition = 7 + 5
- Minus sign - for subtraction = 10 - 5
- Asterisk * for multiplication = 10 * 5
- Forward slash / for division = 10 / 5
- Caret ^ for exponents. = 10^2

Note that formulas in Excel are entered into cells and come first by typing an equal sign (=).



A formula can include cell references, functions, and mathematical and logical operators.

When the data referenced by a formula changes, the result will be recalculated automatically. This allows you to update quickly and modify your data as necessary.

BASIC STRUCTURE AND SYNTAX OF EXCEL FORMULAS

The basic structure of an Excel formula is as follows:

= [operand1] [operator] [operand2]

The equal sign (=) in this structure indicates that the cell holds a formula.

The **operands** are the values or cell references that the excel formula runs on, and the **operator** is the symbol that signifies the mathematical calculation to be done.

Operators in a formula are a crucial part of all of the computations that Excel performs on a Workbook. The ability to understand them is essential if you want to understand formula behavior and solve problems that arise.

Formulas in Excel can be written using several kinds of operators. These include:

- **Mathematical Operators**: These operators perform basic mathematical calculations, such as addition, subtraction, multiplication, and division. Examples of mathematical operators in Excel include:

+ for addition **-** for subtraction

***** for multiplication **/** for division

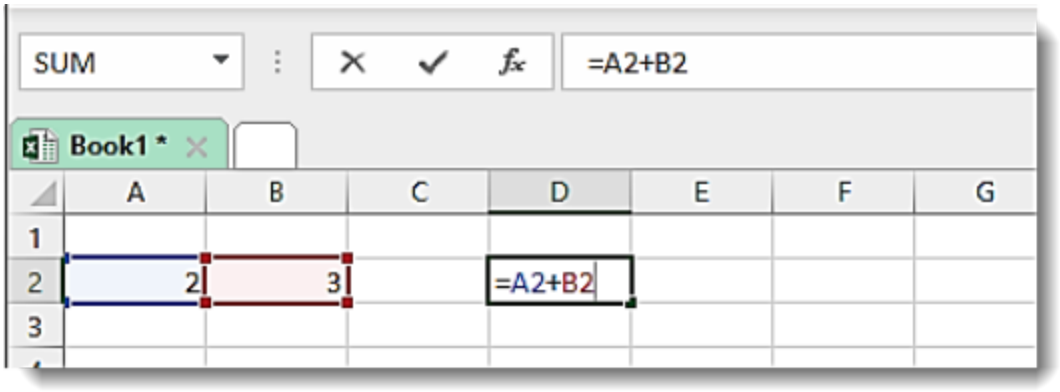
For example, the following Excel formula uses the Mathematical operators;

=**A2**+**B2**

This means **A2** and **B2** are the **operands** in the formula.

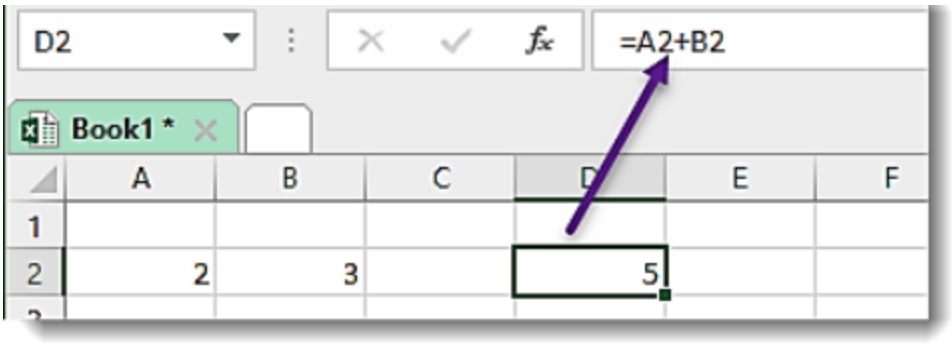
This formula uses the **addition operator (+)** with the values in cells **A2** and **B2**.

When you enter the formula into any cell on the worksheet, it will automatically add the contents of cells **A2** and **B2**.



When done entering a formula, you press the **Enter** key to complete the process. This will automatically show the result in the destination cell.

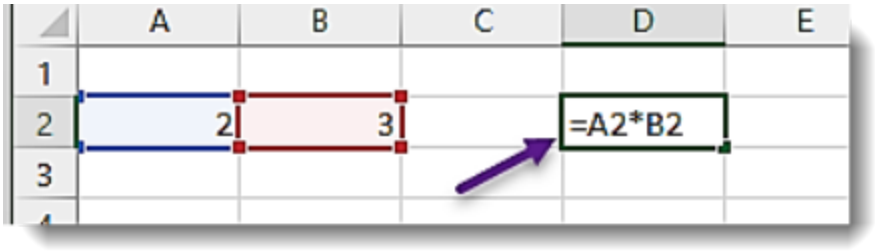
If you go back and click on the cell where you entered the Excel formula, you will see the formula displayed on the formula bar.



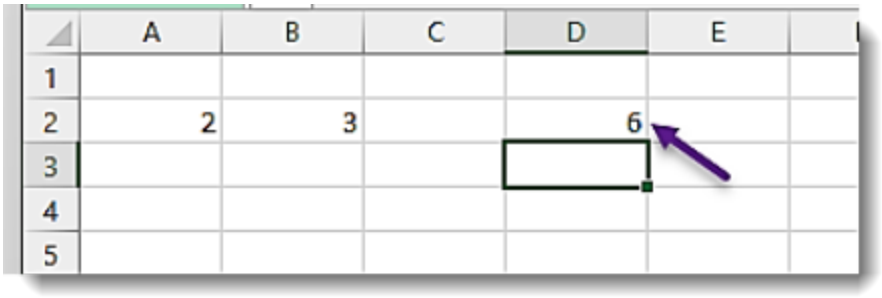
An example of carrying out basic **multiplication** is by using the formula;

=A2*B2

This formula multiplies the content or values in cells **A2** by **B2**.



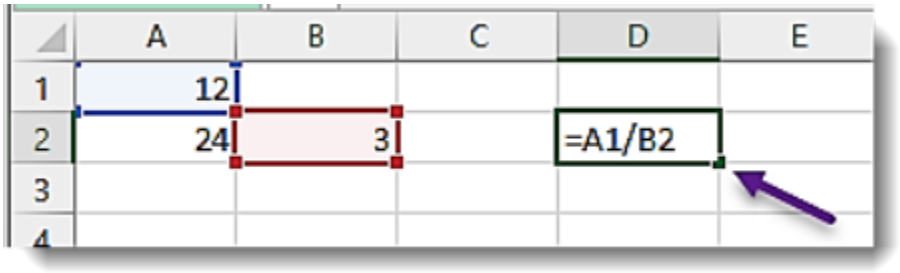
When you press the **Enter** key, your result in cell **D2** will be **6**.



For **Division**, the basic formula is as follows;

=A1/B2

This formula carries out basic **division** calculations. The destination cell divides the value in cell **A1** by the value in cell **B2**.


A
B
C
D
E
1
12
2
24
3
=A1/B2
3
4

EXCEL ORDER OF OPERATIONS

The order of operations determines how calculations are performed in an Excel formula. Understanding this order is essential as it can impact the final result.

Excel has a set hierarchy for the order of operations. The tasks at the top of the hierarchy are done before those at the bottom. In Excel, tasks are done in the following order:

- **Parentheses**( ): The operations contained within parentheses are always completed before anything else.
- **Exponents**^: The next step is to compute the exponents, which include squares and cubes.
- **Multiplication** * and **Division** /: The order in which these operation are carried out is left to right.
- **Addition** + and **Subtraction -**: These operations are executed in the same sequence, from left to right.

When you are creating a formula that involves different types of operations, it is really important to use parentheses to indicate the order in which the operations should be executed. This will help ensure that the formula produces the correct result.

For example, in the formula; **=3+(4*5)**

The multiplication operation (**4*5**) will be carried out before the addition operation **3+** because multiplication and division operations have higher precedence than addition and subtraction.

To force Excel to handle the addition operation first, you must use parentheses like this:

=(3+4)*5.

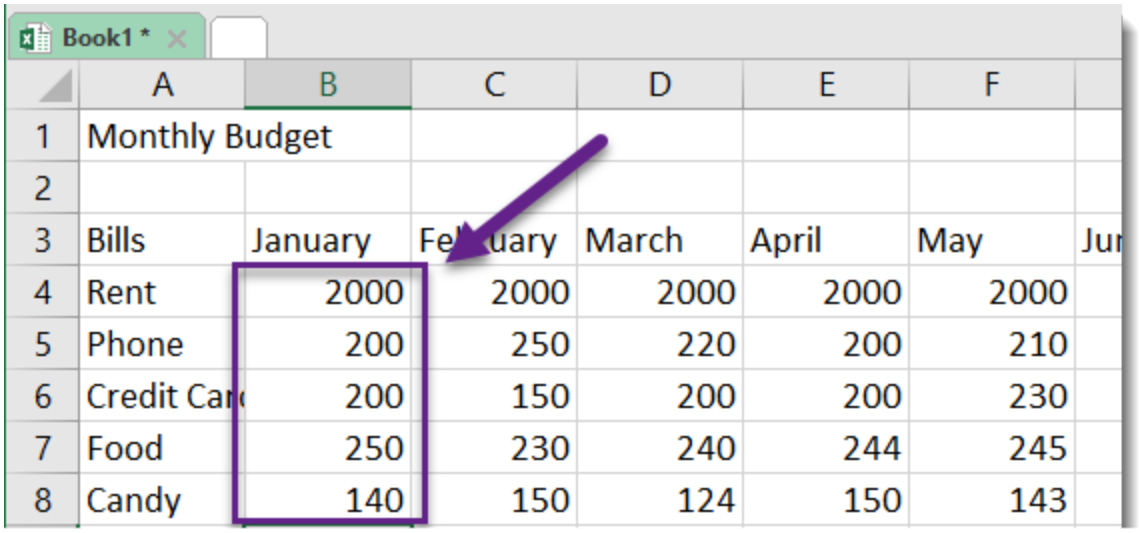
The result of this will be **35**.

Understanding the order of operations will go a long way to help you create an accurate and well-organized formula.

HOW TO CREATE A SIMPLE EXCEL FORMULA

A simple concept illustrated below is that of a Monthly Budget Worksheet.

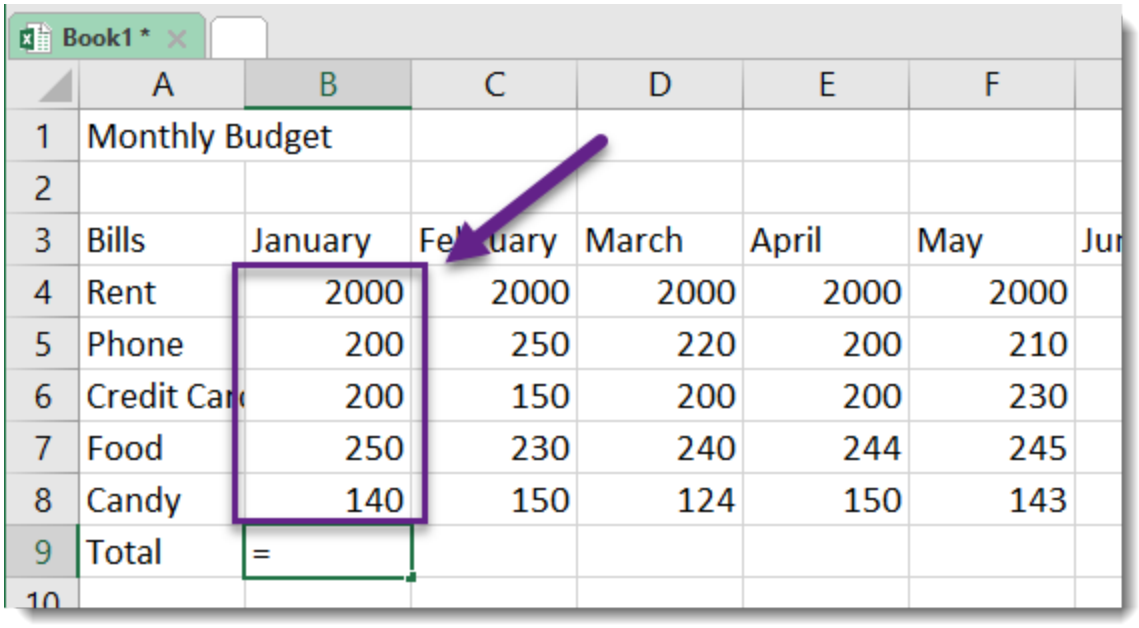
Using the workbook you must have created named **Assignment 1,** the Total Bills for January will be calculated, and the result will appear in cell **B9.**



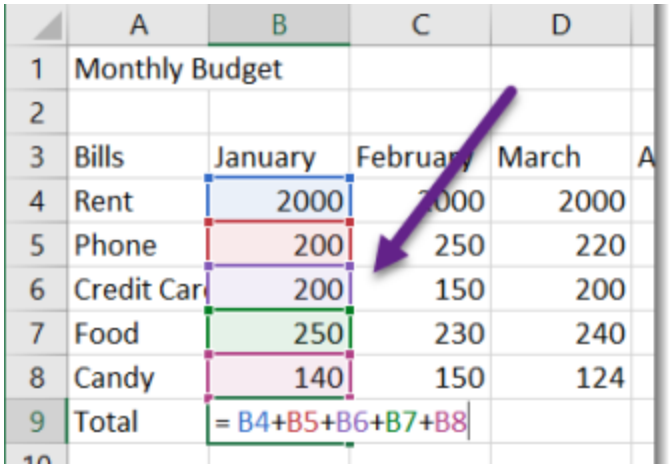
1. Select the cell where the result will appear. On the Monthly Budget sheet, we will create a formula to compute the **Total** for each month, starting with cell **B9**.

2. Click on cell **B9** and type in the **equals sign =**.

1. The operator we will be using is the plus sign +. This means we will add values in cells **B4**, **B5**, **B6**, **B7,** and **B8.**

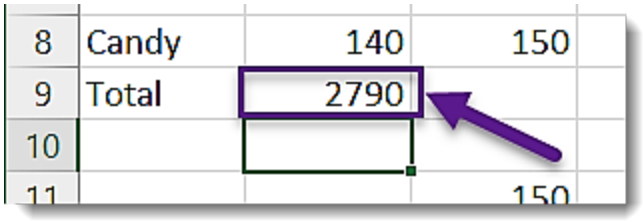


1. That will look like = B4+B5+B6+B7+B8



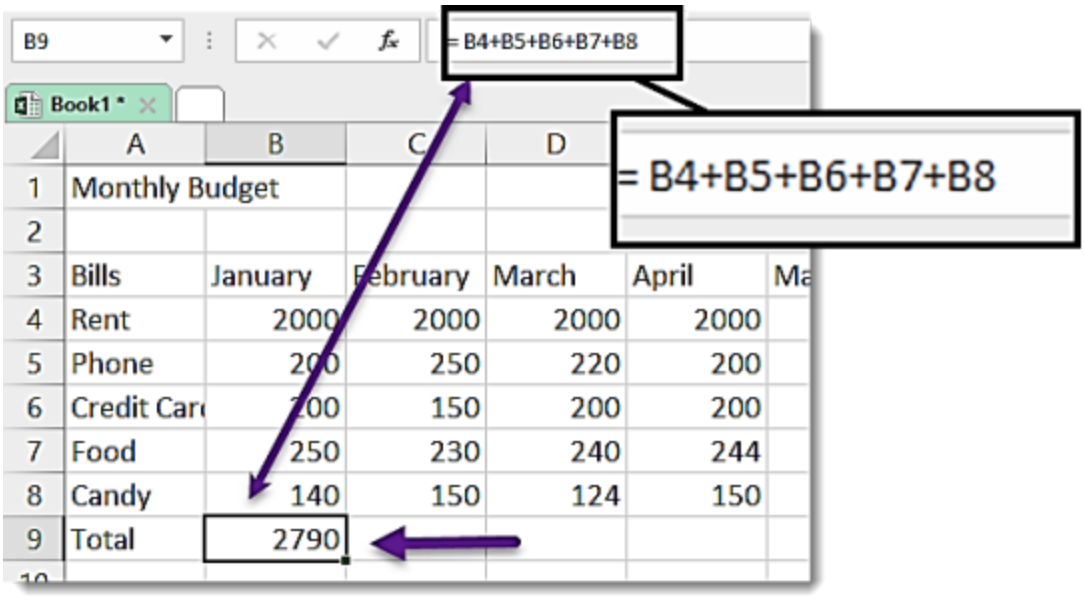
The affected cells will be highlighted with different colors.

1. Press the **Enter** key on your keyboard to complete the process. You will see the result automatically displayed in cell **B9.**


8 Candy 140 150
9 Total 2790
10
11 150

HOW TO EDIT AN EXCEL FORMULA

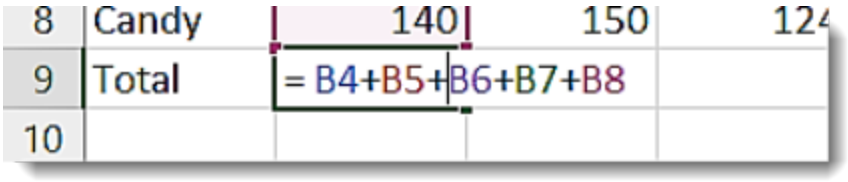
To edit an existing formula in a worksheet, click on the cell where you have the formula. The formula bar will automatically display the formula.



	A	B	C	D	E
1	Monthly Budget				
2					
3	Bills	January	February	March	April
4	Rent	2000	2000	2000	2000
5	Phone	200	250	220	200
6	Credit Car	200	150	200	200
7	Food	250	230	240	244
8	Candy	140	150	124	150
9	Total	2790			

Click the formula bar and edit the formula, then press the **Enter** key when done to complete the process.

You can also double-click the affected cell to edit the formula directly.



When done, always press the **Enter** key to complete the process.

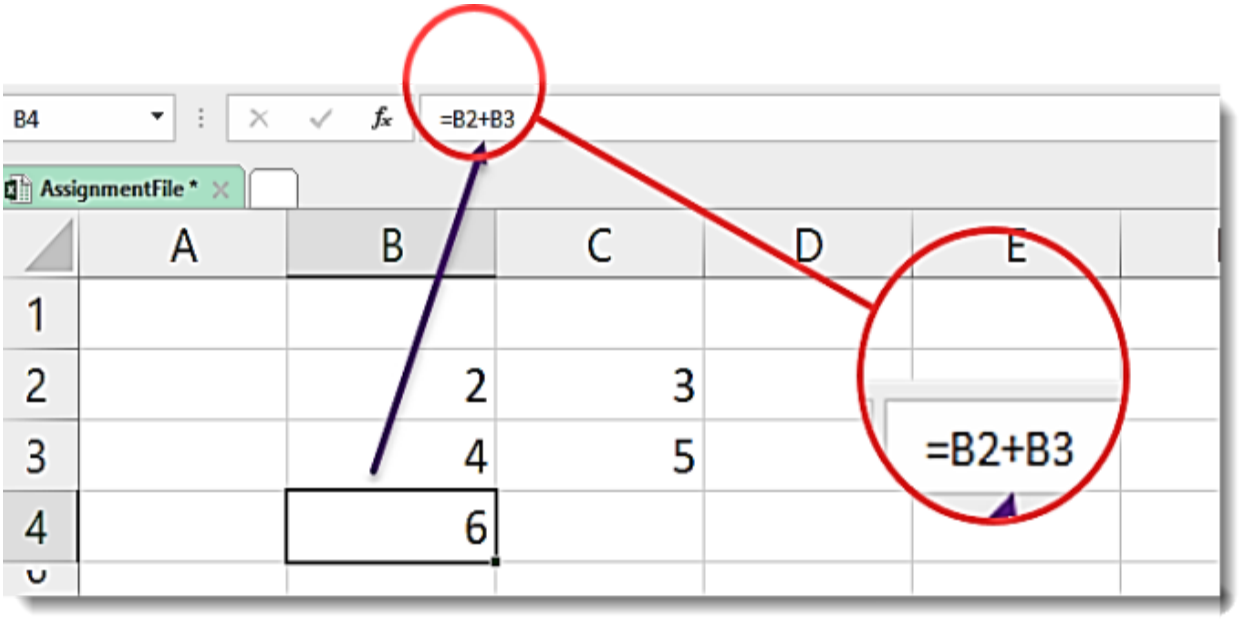
If you suddenly change your mind, press the **Esc** key.

Excel formulas also use **Functions**; functions are predefined formulas to perform specific or more complicated math calculations and data retrieval.

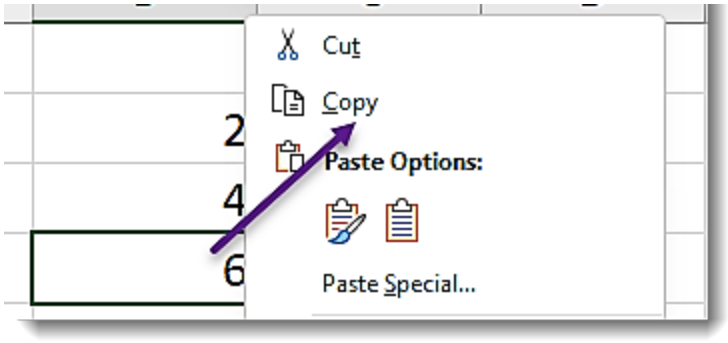
COPY/PASTE AN EXCEL FORMULA

Excel automatically updates the cell references in a formula when you copy it to a new location. To see this in action, follow these steps.

Open a bank Worksheet and enter values in cell **B2, B3, C2** and **C3.** Then enter the formula shown below in the formula bar into cell **B4**.

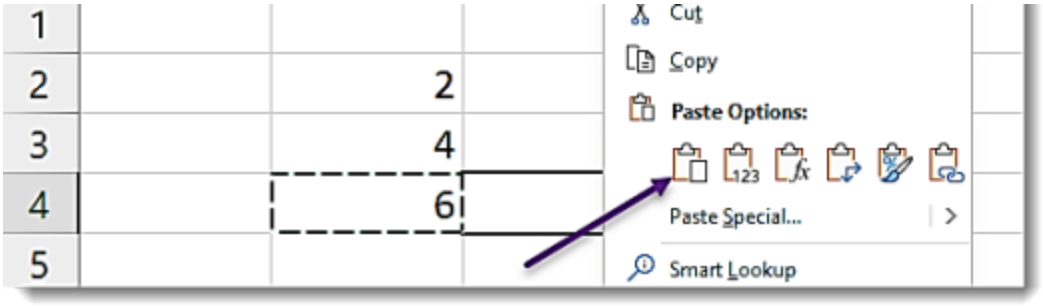


Select cell **B4**, right-click, and then click on **Copy** (or use the shortcut keys **CTRL + C**).

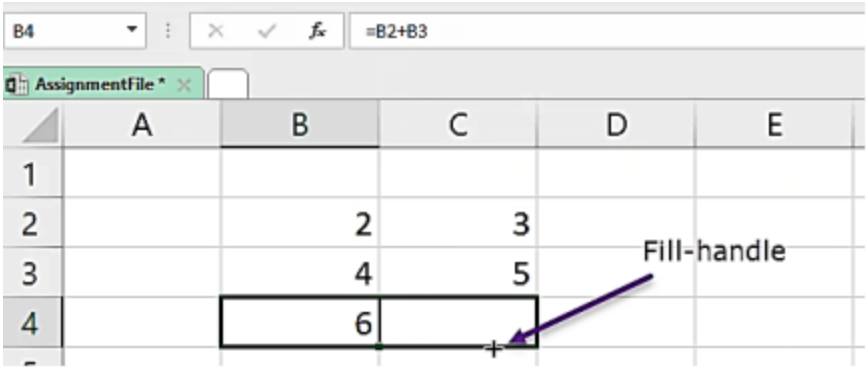


Next, click cell **C4**, and Paste the formula.

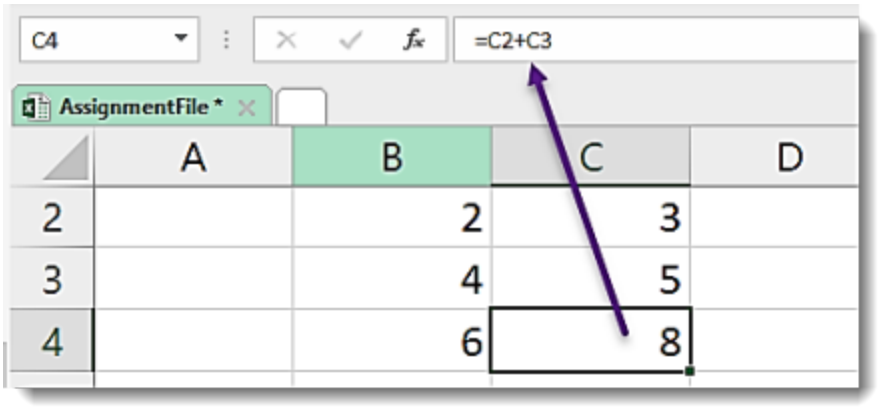
To paste the content you copied, you either right-click and select **Paste** or use the shortcut keys **CTRL + V.**



Another way is to use the Fill-handle to drag and fill the formula across to Cell **C4.**



The formula will automatically adjust to the new cell.



LESSON 7

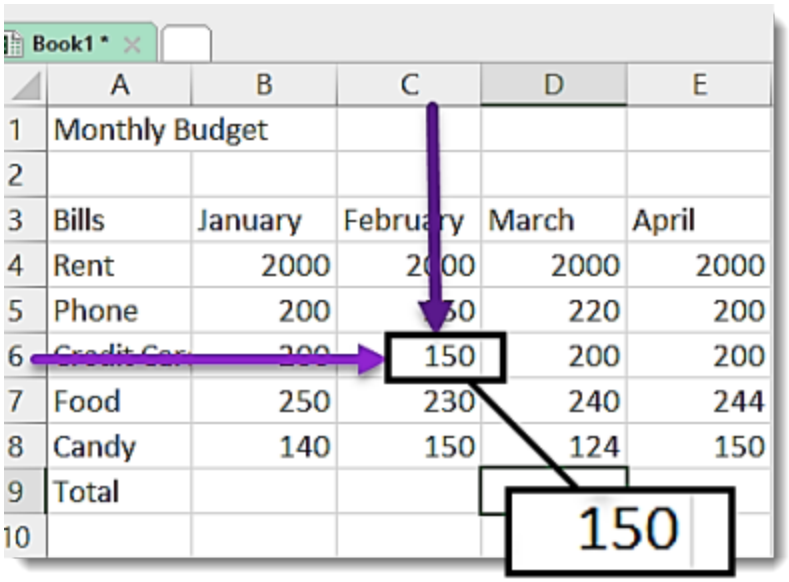
EXCEL CELL REFERENCING

Cell references refer to the value or content of a cell in a workbook. They're vital for those who work with data because they allow you to create formulas and functions that refer to data in multiple cells. These formulas and functions are handy when working with data in Excel. There are different types of cell references that you can use in Excel, each with its own rules and syntax that you need to follow. So, it is crucial to understand them well to use them effectively.

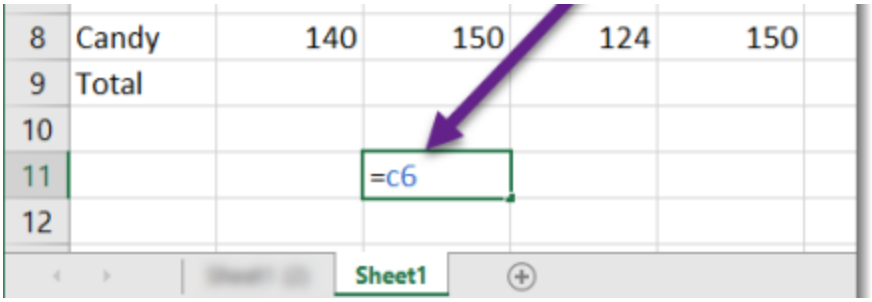
SIMPLE CELL REFERENCE

The simplest way to refer to a cell is to write the name of the cell after an **equal** sign.

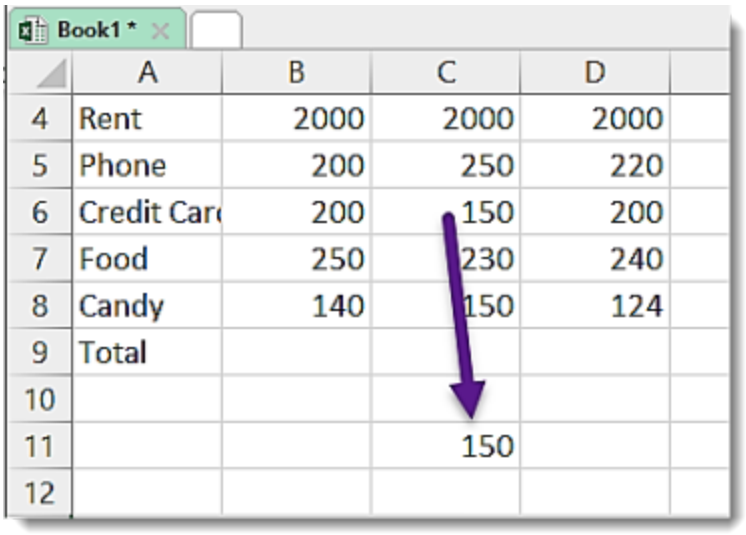
For example, **=C6** refers to the value within cell **C6,** as shown in the illustration below.



So, if you refer to the cell **C6** by entering **=C6** in another cell, the content of cell **C6** will automatically appear without you typing it in.



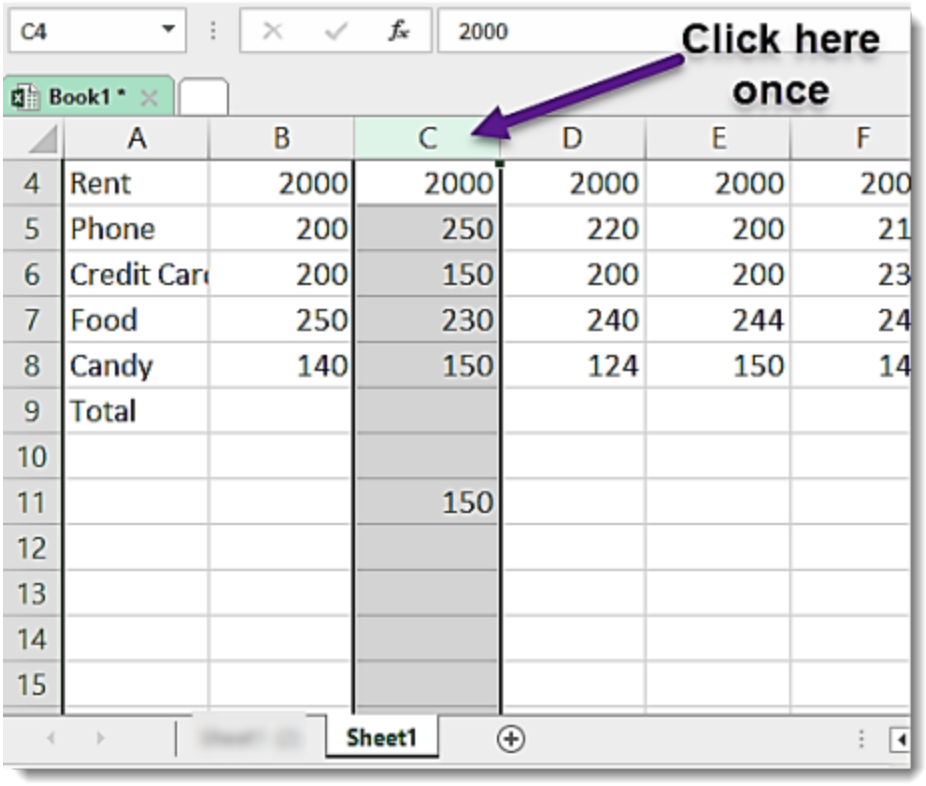
Once you press the **Enter** key on your keyboard, the value 150 will appear in cell **C11.**



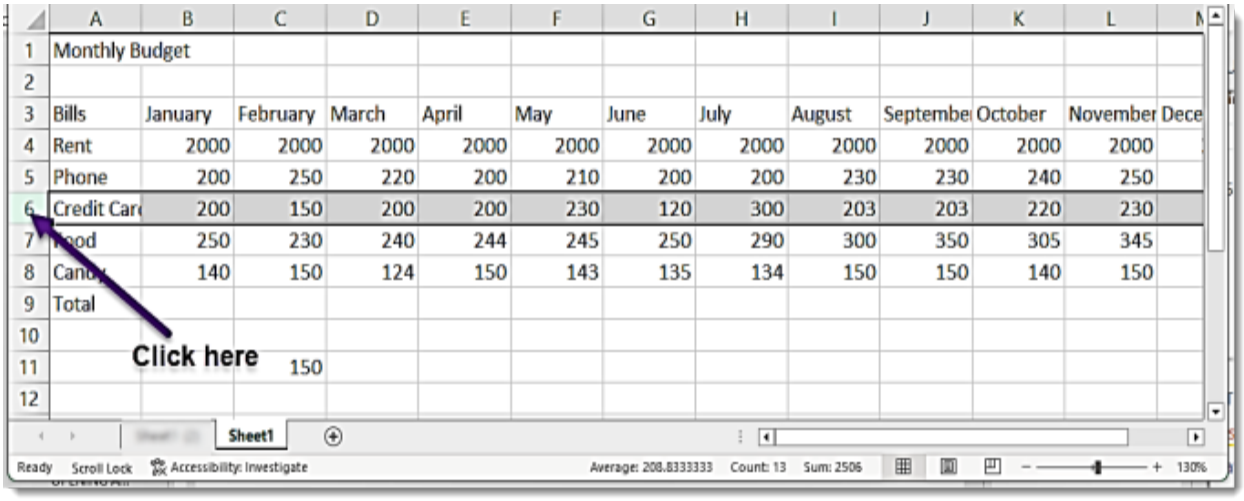
REFERRING TO A CELL RANGE

An Excel cell range refers to a group of two or more cells that have been selected.

When you **single-click** on a particular column header, the entire column will be selected as a range.

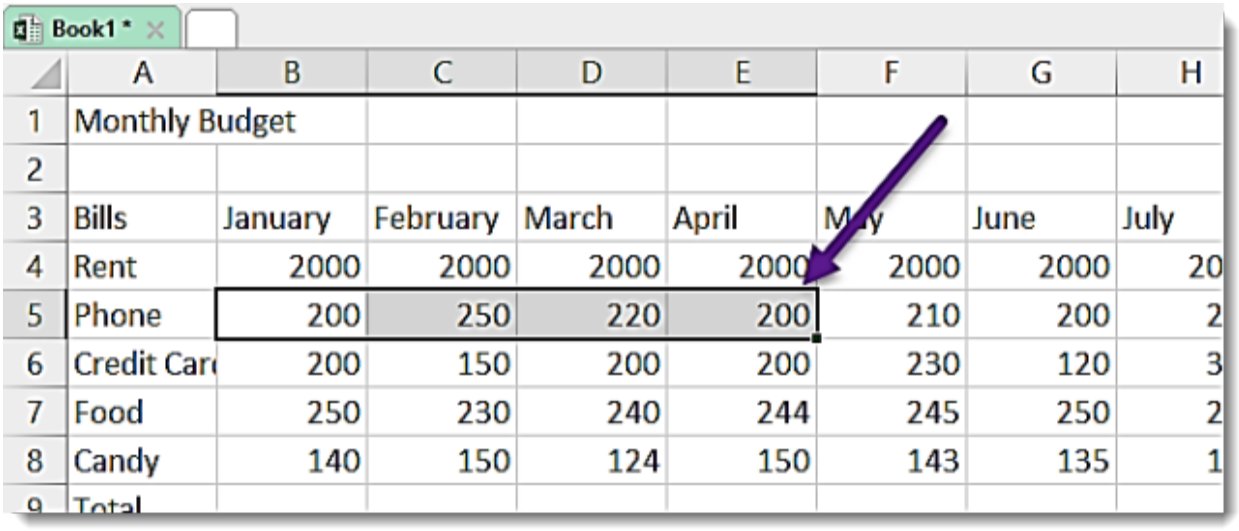


The same happens when you click on a row header.



To select a range of cells, you click, hold, and drag the mouse to the point where you want to stop.

If we are to select the amount spent on phone calls from January to April using the illustration below, that will be cell **B5** to Cell **E5.**



You have to go to cell **B5,** click, hold, and drag the mouse to cell **E5.**

Excel will recognize the selected cells as range **C5:E5.**

The notation =**C5:E5** refers to cell range **C5** through **E5**.

ABSOLUTE, RELATIVE, AND MIXED CELL REFERENCES IN EXCEL

Cell references are a great way to work with data in Excel since they let you create formulas and functions that are dynamic and flexible. However, Knowing the different types of cell references and how to use them is important because using the wrong t reference can lead to calculation errors.

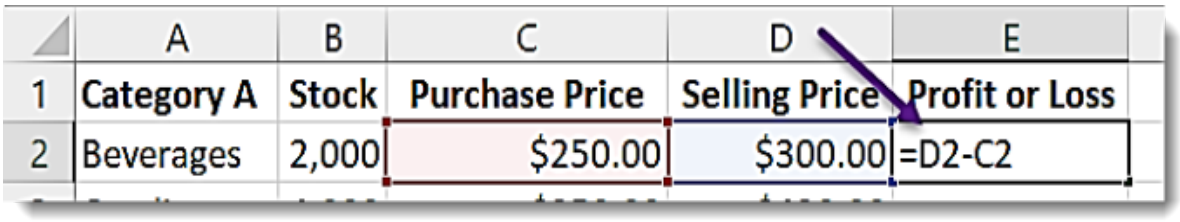
Excel has three types of cell references: relative, absolute, and mixed. Excel formulas and functions can be faster and easier if you understand these different references.

A relative cell reference describes the cell's location relative to the reference cell. Copying a formula with a relative cell reference will automatically adjust the reference to the new location.

In the following example, you have a set of data as follows:

	A	B	C	D	E
1	**Category A**	**Stock**	**Purchase Price**	**Selling Price**	**Profit or Loss**
2	Beverages	2,000	$250.00	$300.00	
3	Condiments	4,000	$350.00	$420.00	
4					

Supposing you want to calculate each item's **Profit** or **Loss** by subtracting the **Purchase Price** from the **Selling Price**. You can use a relative cell reference to refer to your formula's **Purchase Price** and **Selling Price** columns, as illustrated below.

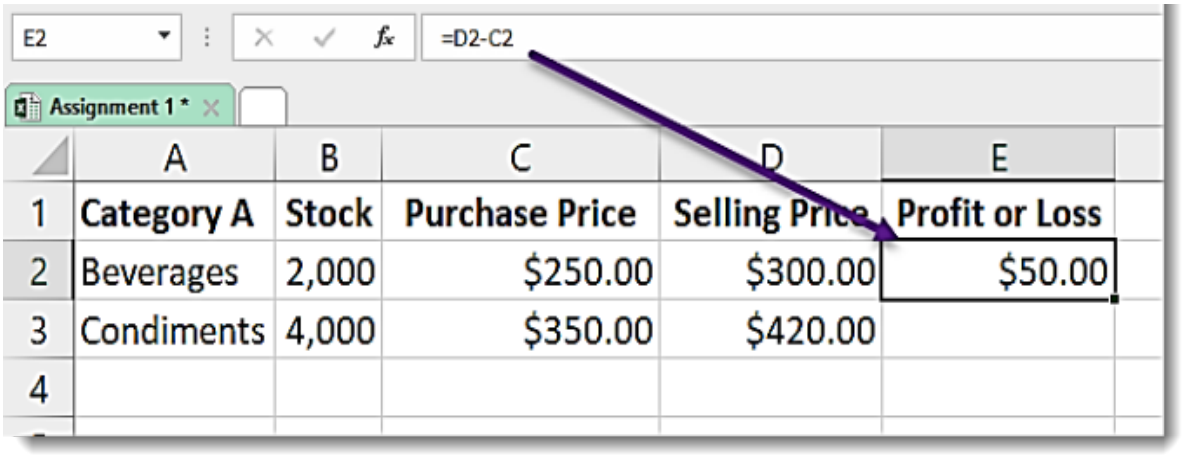


	A	B	C	D	E
1	Category A	Stock	Purchase Price	Selling Price	Profit or Loss
2	Beverages	2,000	$250.00	$300.00	=D2-C2

To do this, you enter the formula **=D2-C2** in cell **E2**.

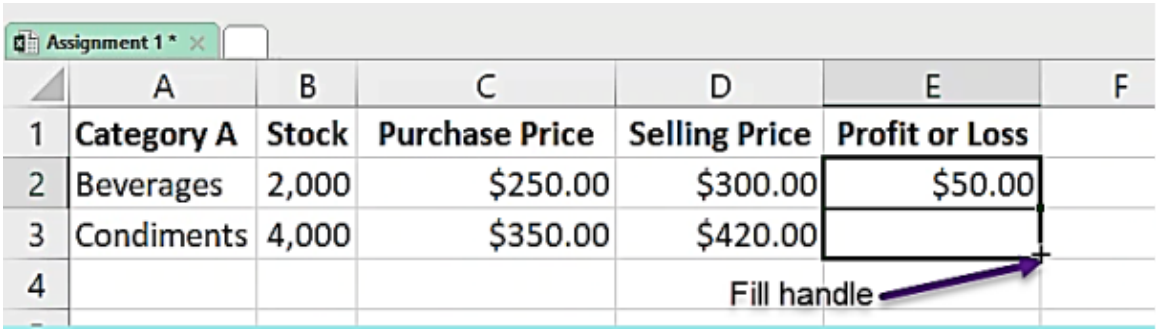
This formula will subtract the value in cell **C2** (the **Purchase price** of that particular stock) from the value in cell **D2** (the **Selling Price** from Beverages in row 2).

This formula will give you a **Profit or Loss** of **$50** for Beverages.

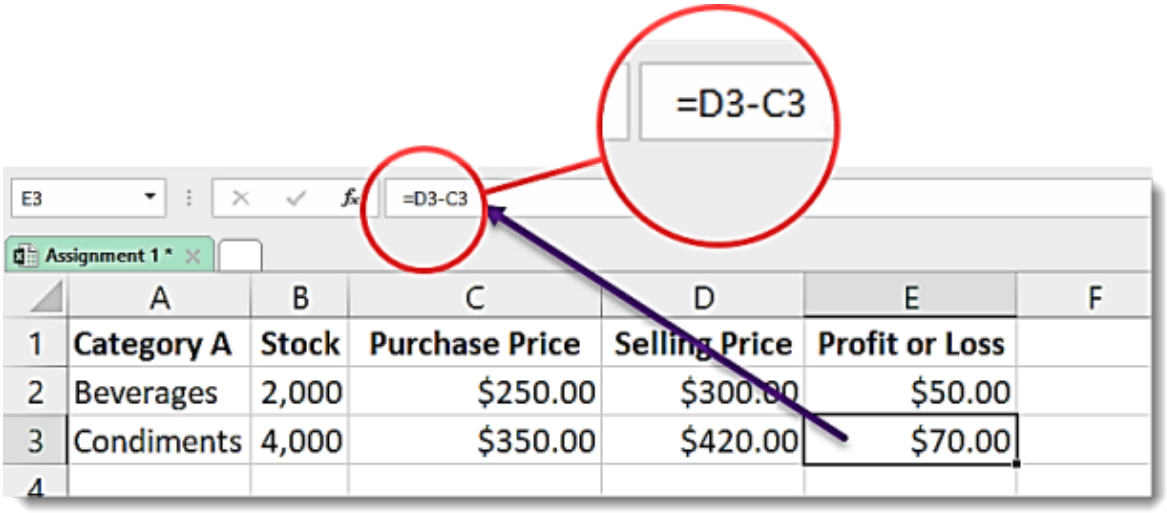


	A	B	C	D	E
1	Category A	Stock	Purchase Price	Selling Price	Profit or Loss
2	Beverages	2,000	$250.00	$300.00	$50.00
3	Condiments	4,000	$350.00	$420.00	
4					

Instead of entering the formula separately for each cell in the worksheet, you can copy or drag-fill (using the fill handle) the formula from cell **E2** and paste it into all the other cells in the worksheet (in column **E**). Upon doing that, you will notice that the reference to the cell automatically adjusts to refer to the row in which it belongs.



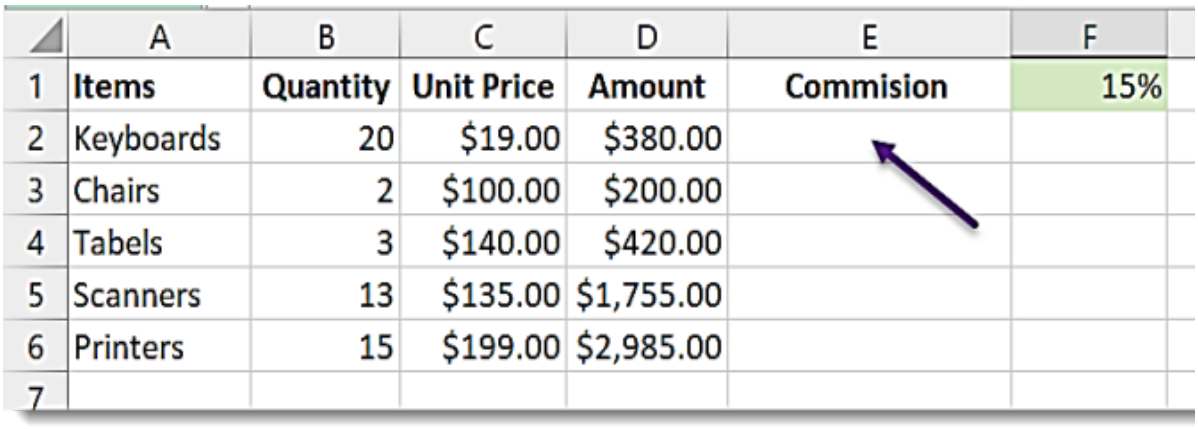
The formula for cell **E3**, for instance, becomes **=D3-C3**, giving you a **Profit or Loss** of $70 for Condiments.



Using **Relative cell references** in Excel allows you to create formulas and functions that are flexible and dynamic, giving you the ability to perform mathematical calculations.

On the other hand, the **absolute cell references** do not change when you copy the formula to other cells, unlike relative cell references.

Let's say you have this data set with the total sales for each item, and you have to figure out the commission.



	A	B	C	D	E	F
1	**Items**	**Quantity**	**Unit Price**	**Amount**	**Commision**	15%
2	Keyboards	20	$19.00	$380.00		
3	Chairs	2	$100.00	$200.00		
4	Tabels	3	$140.00	$420.00		
5	Scanners	13	$135.00	$1,755.00		
6	Printers	15	$199.00	$2,985.00		
7						

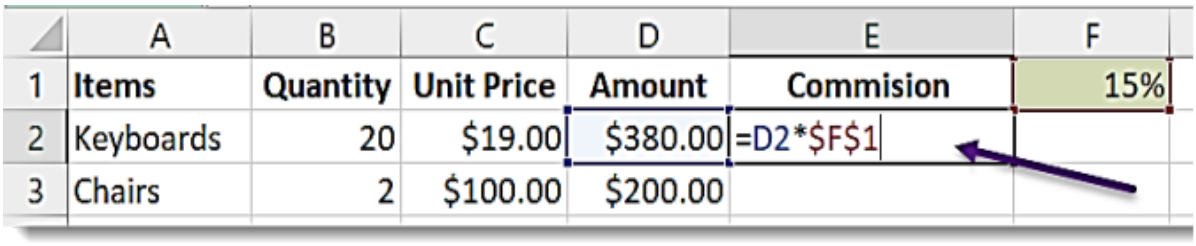
Cell **E2** has a commission of 15%. Any formula you enter in cell **E2** will be copied into the other cells to find the commission for each item.

An absolute cell reference can be created using the **dollar sign** ($) to anchor the reference to a specific row or column.

In this example, you would use the dollar sign ($) to anchor the reference to a specific cell.

So the formula to enter into cell **E2** is;

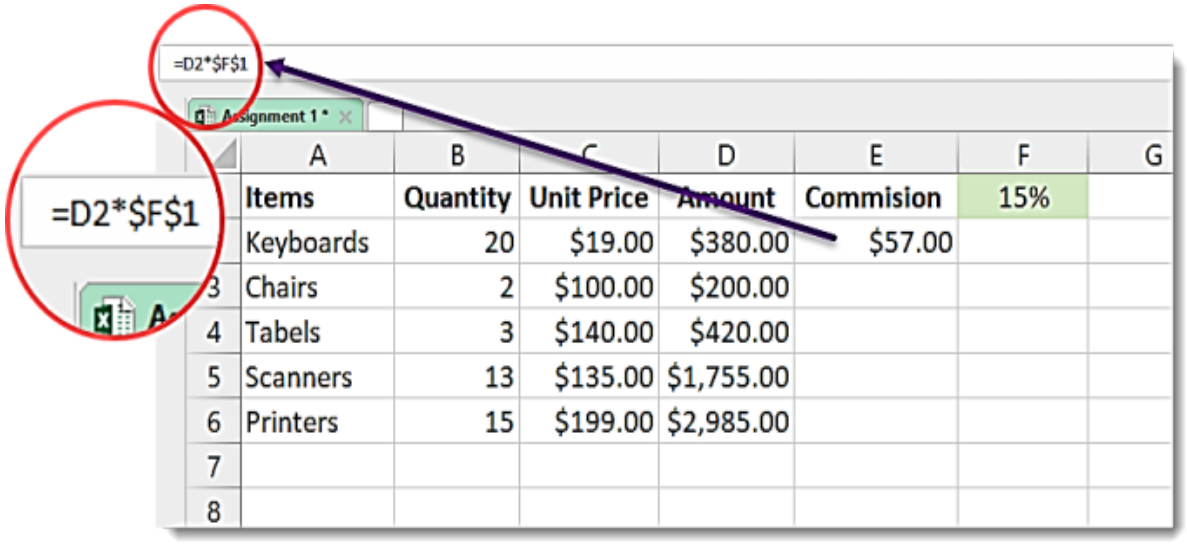
=D2*F1



	A	B	C	D	E	F
1	**Items**	**Quantity**	**Unit Price**	**Amount**	**Commision**	15%
2	Keyboards	20	$19.00	$380.00	=D2*F1	
3	Chairs	2	$100.00	$200.00		

This formula multiplies the value in cell **D2** by the value in cell **F1** to calculate the commission.

The reference to cell **F1** is absolute because it is **anchored** to that **specific** cell, regardless of where the formula is copied into.



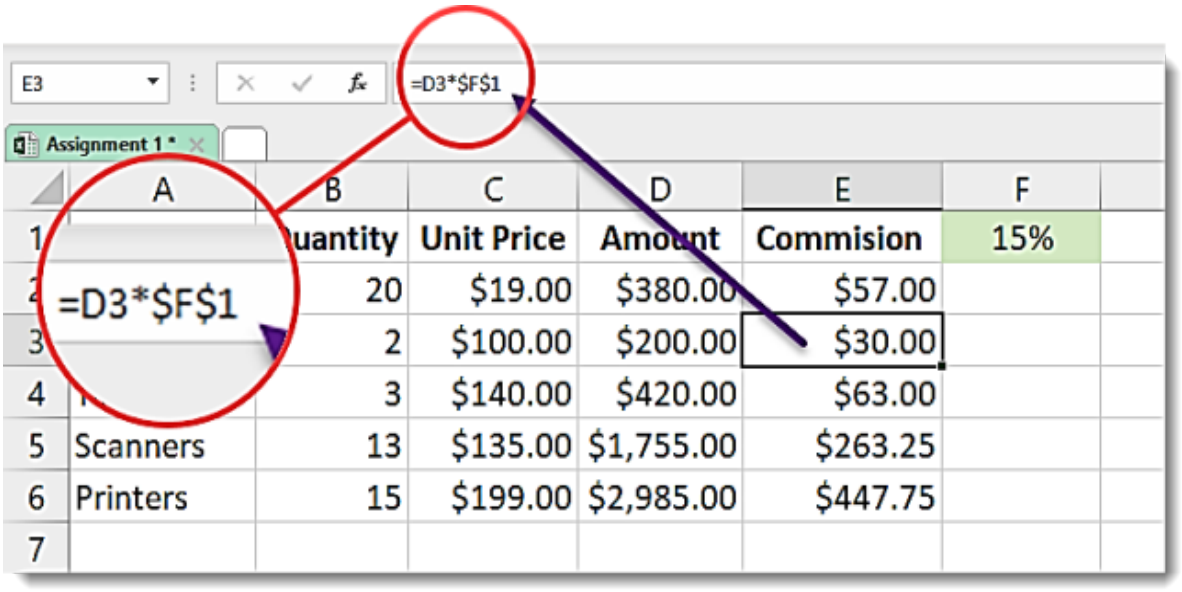
	A	B	C	D	E	F	G
1	**Items**	**Quantity**	**Unit Price**	**Amount**	**Commision**	15%	
2	Keyboards	20	$19.00	$380.00	$57.00		
3	Chairs	2	$100.00	$200.00			
4	Tabels	3	$140.00	$420.00			
5	Scanners	13	$135.00	$1,755.00			
6	Printers	15	$199.00	$2,985.00			
7							
8							

Drag and fill the formula to copy it into the other cells along the same column.

The cell reference to cell **F1** will remain unchanged, while the reference to column **D** will be adjusted relative to the new cell location.

Therefore, the formula in cell **E3** would become:

=D3*F1



This formula multiplies the value in cell **D3** by the value in cell **F1** to calculate the commission.

Absolute cell references allow you to use a **fixed** cell reference in a formula, even when the formula is copied to other cells. This can be useful when using a constant value in a formula, such as a tax rate or commission percentage.

A **Mixed cell reference** is similar to a relative cell reference, except that it anchors the coordinates of one row or column to a specific value.

Mixed cell references can be useful when you want one cell reference to be fixed but the other to change based on the formula location.

Mixed cell references can be in two forms:

- When you copy a formula, the row stays locked while the column changes.
- The column stays locked while the row changes when you copy the formula.

For example, the illustration below is a data set with commission calculated for the percentage value in cells **E2**, and **F2** .

	A	B	C	D	E	F	G
1					Commision		
2					15%	25%	
3	**Items**	**Quantity**	**Unit Price**	**Amount**	**1st Class**	**2nd Class**	
4	Keyboards	20	$19.00	$380.00			
5	Chairs	2	$100.00	$200.00			
6	Tabels	3	$140.00	$420.00			
7	Scanners	13	$135.00	$1,755.00			
8	Printers	15	$199.00	$2,985.00			
9							

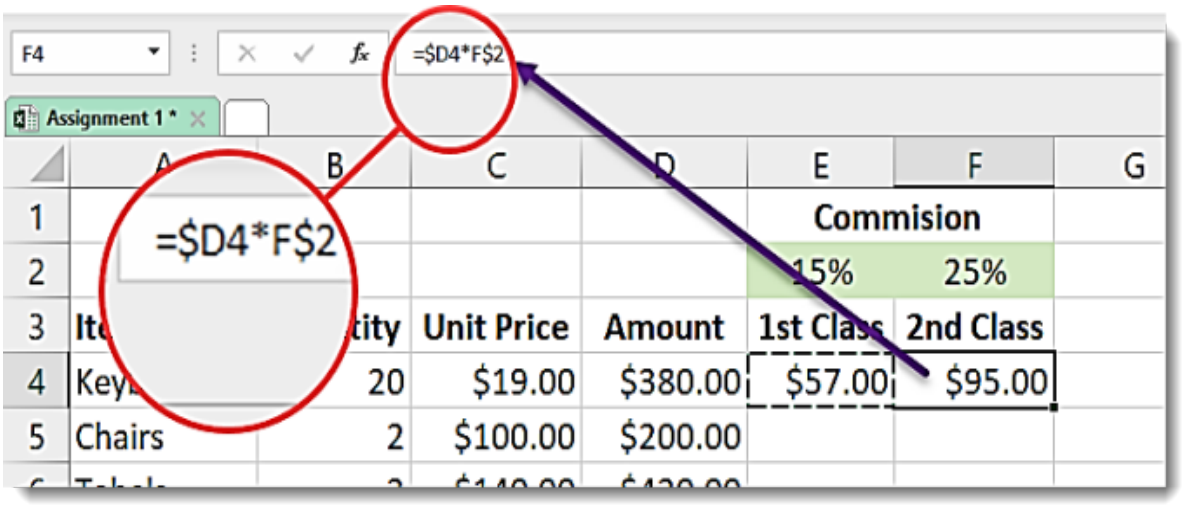
All these commissions can be calculated using mixed references.

In cell **E4,** the formula to be entered is;

=$D4*E$2

	A	B	C	D	E	F
1					Commision	
2					15%	25%
3	**Items**	**Quantity**	**Unit Price**	**Amount**	**1st Class**	**2nd Class**
4	Keyboards	20	$19.00	$380.00	=$D4*E$2	
5	Chairs	2	$100.00	$200.00		

Copy the formula in cell **E4** and paste it in cell **F4**.

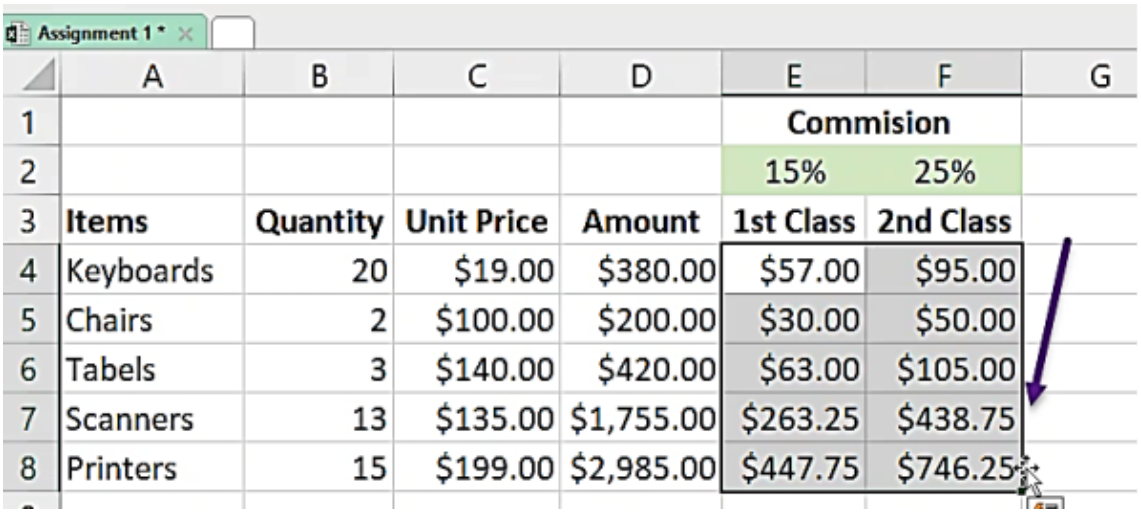


This will automatically adjust the relative formula **E$2** to **F$2,** yet maintaining the absolute **$D4**.

In other words, in a mixed cell reference, you have a situation where either the row or the column is locked.

If you want the row or the column to remain fixed, place a dollar sign as an anchor.

When done entering the formula in cells **E4** and **F4,** use the mouse to Fill-down by dragging the fill handle after selecting both cells **E4** and **F4.**



If the dollar sign appears before an **alphabet**, **$D4,** the column is locked and doesn't change when copied into another cell.

If the dollar sign appears before the **number E$2,** the row is locked and doesn't change when copied into another cell.

REFERENCING ANOTHER EXCEL SHEET OR WORKBOOK

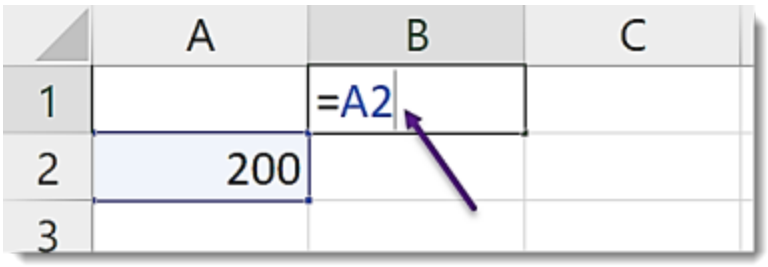
A cell reference or range reference can be used to reference cells or ranges of cells on another sheet or workbook. It can be helpful in many situations, such as when you want to use data from another worksheet or workbook in a formula or function or when you want to create a summary of data from multiple worksheets or workbooks using a formula.

REFERENCING A CELL WITHIN A WORKSHEET

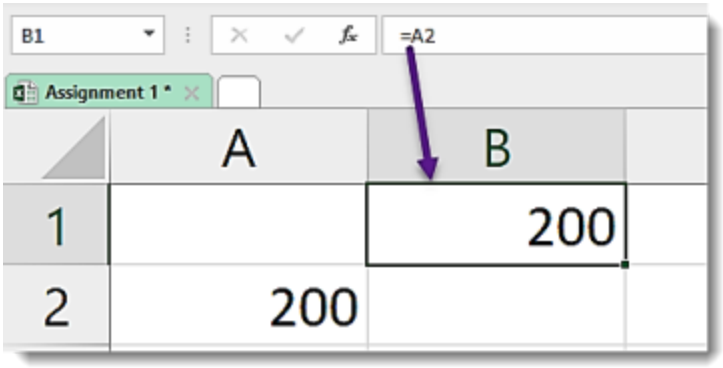
This method is the most basic in referencing a cell within the same worksheet.

For example, if in cell **A2** you have a value **and** you want to refer to the value in the same cell **A2** to have the data appear in cell **B1**, the formula would be:

=A2



By doing this, the value you put in the cell where you use this reference will be the same as in cell **A2**.



When you make any changes in cell **A2**, these will reflect in cell **B1** where you use this reference.

REFERENCING A CELL IN ANOTHER WORKSHEET

The format used to create a formula that refers to another sheet in the same workbook is as follows:

Sheet_name!Cell_address

It starts with the **Worksheet name**, followed by an **exclamation mark**, and then the **cell reference**.

Here is how you refer to cell **A2** in **Sheet 1**:

=Sheet1!A2

Here is how to refer to a range of cells in another sheet:

Sheet_name!First_cell:Last_cell

Here is how to refer to the range **A2:C5** in another sheet in the same workbook:

=Sheet1!A2:C5

In the illustration below, you can see only the reference to the cell or the range, not the actual data.

There would be a time when you would need to use these in formulas.

As far as the format of the references mentioned above goes, they will be the same always.

The worksheet you refer to would likely have multiple words in the name. For instance, the worksheet may be named **Site data** or **Supply data**.

Use the worksheet's name with a single quote regarding spaces or non-alphabetic characters (like @, #, !, -, etc.).

For example, to refer to cell **A2** in a worksheet named **Supply Data**, the format is as follows:

='Supply Data'!A2

Note: Referring to a sheet in the same workbook and then renaming it won't break the reference. These references will be updated automatically by Excel.

Knowing the format of these references is excellent, but manually typing them isn't so great in practice. The process would be time-consuming and error-prone.

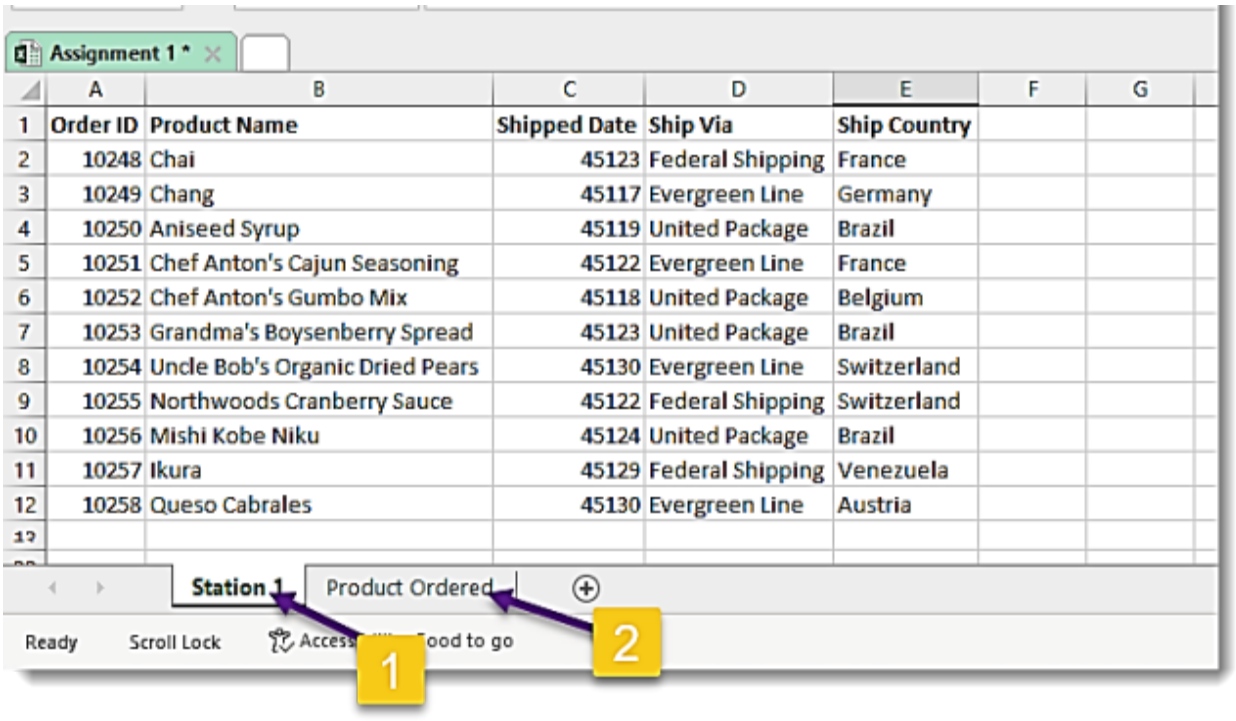
AUTOMATED REFERENCE TO ANOTHER WORKSHEET IN THE SAME WORKBOOK

Creating cell references to another sheet is much easier if you point Excel at the cell/range you want to refer to and let it do the work. You won't have to worry about missing exclamation points, quotes, or other format issues. The reference will be created automatically by Excel.

Here's how to create an automatic reference:

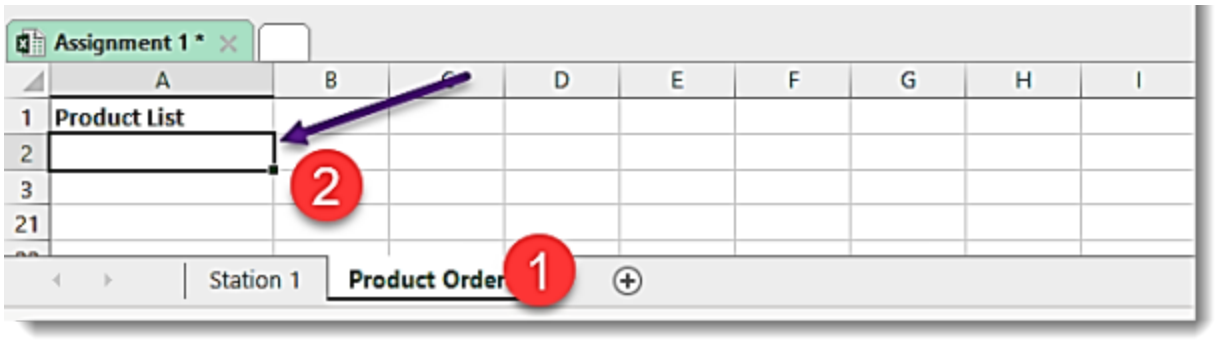
The illustration below shows we have **Station 1** and **Product Ordered** worksheets.

The idea is to refer to **Station 1** to get the List of **Products ordered** (Column B) into the **Product Ordered** sheet**.**

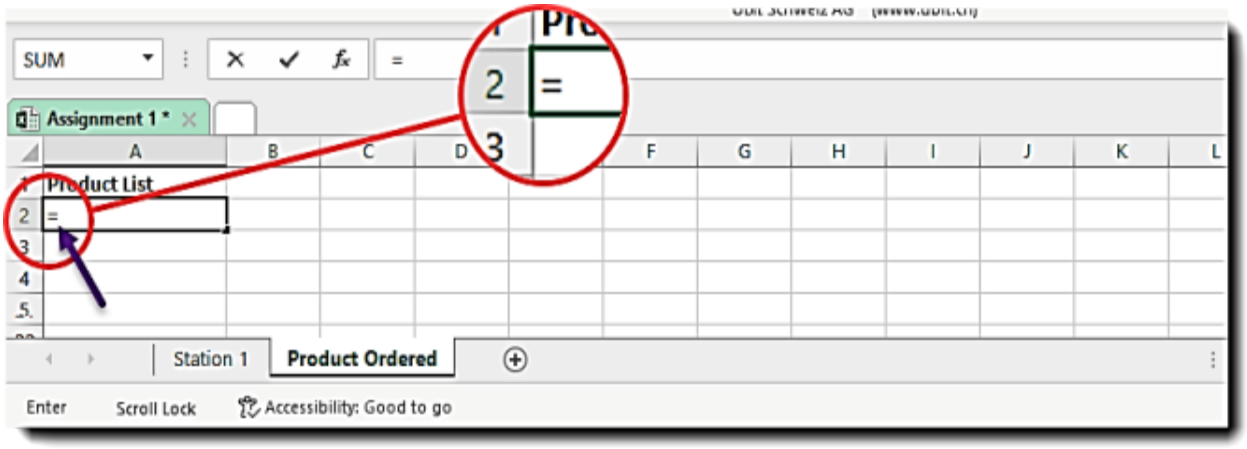


	A	B	C	D	E	F	G
1	Order ID	Product Name	Shipped Date	Ship Via	Ship Country		
2	10248	Chai	45123	Federal Shipping	France		
3	10249	Chang	45117	Evergreen Line	Germany		
4	10250	Aniseed Syrup	45119	United Package	Brazil		
5	10251	Chef Anton's Cajun Seasoning	45122	Evergreen Line	France		
6	10252	Chef Anton's Gumbo Mix	45118	United Package	Belgium		
7	10253	Grandma's Boysenberry Spread	45123	United Package	Brazil		
8	10254	Uncle Bob's Organic Dried Pears	45130	Evergreen Line	Switzerland		
9	10255	Northwoods Cranberry Sauce	45122	Federal Shipping	Switzerland		
10	10256	Mishi Kobe Niku	45124	United Package	Brazil		
11	10257	Ikura	45129	Federal Shipping	Venezuela		
12	10258	Queso Cabrales	45130	Evergreen Line	Austria		

1. Click on the **Product Ordered** sheet and select cell **A2** (under **Product List**) to enter the reference.



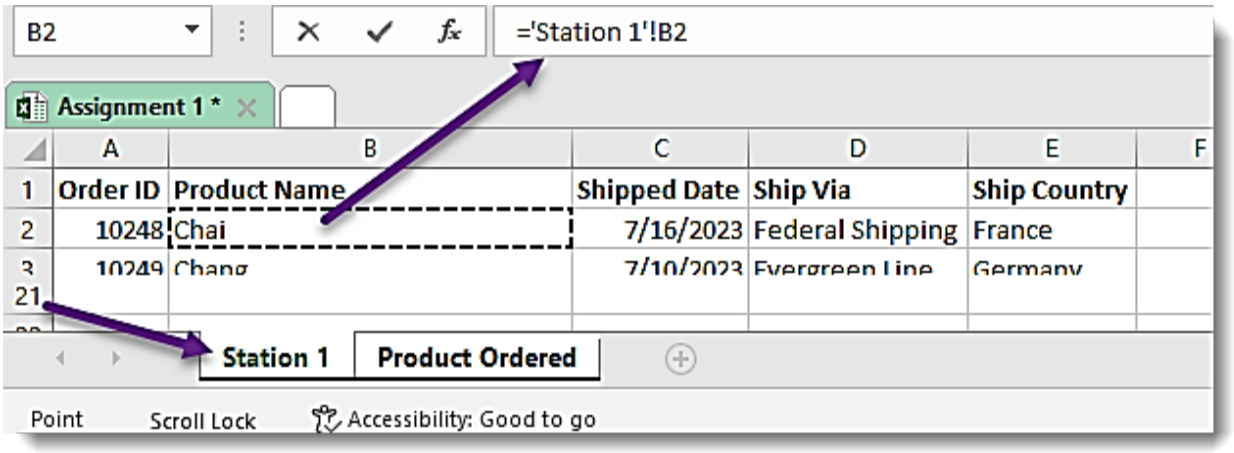
1. Enter the formula you want to use until you reach the point where you want to reference the other worksheet. However, since we are only interested in capturing the text values (Product name in the **Station 1** sheet), the formula will start with an **equal sign** =



1. With your cursor still in cell **A2** (in the **Product Ordered** sheet), after typing the **equal sign** =, click on the **Station 1** sheet and select cell **B2**

(Under the **Product Name**). This is the format you use to refer to another sheet.

2. You will see the cell reference formula automatically created by Excel on the formula bar in the **Station 1** sheet.

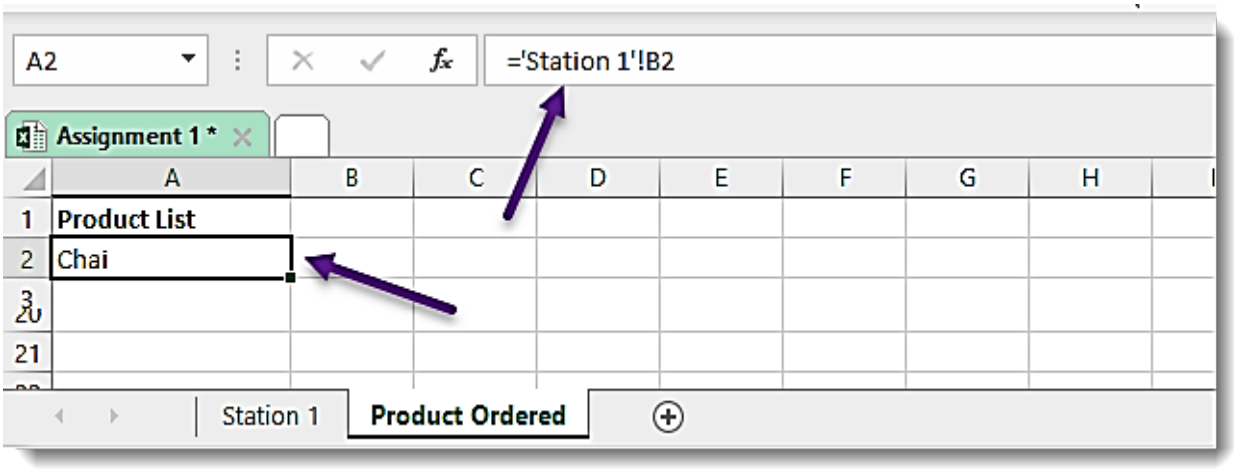


As you can see in the illustration above, on the formula bar, you have;

='Station 1'!B2

This means the formula refers to cell **B2** in the Worksheet called **Station 1.**

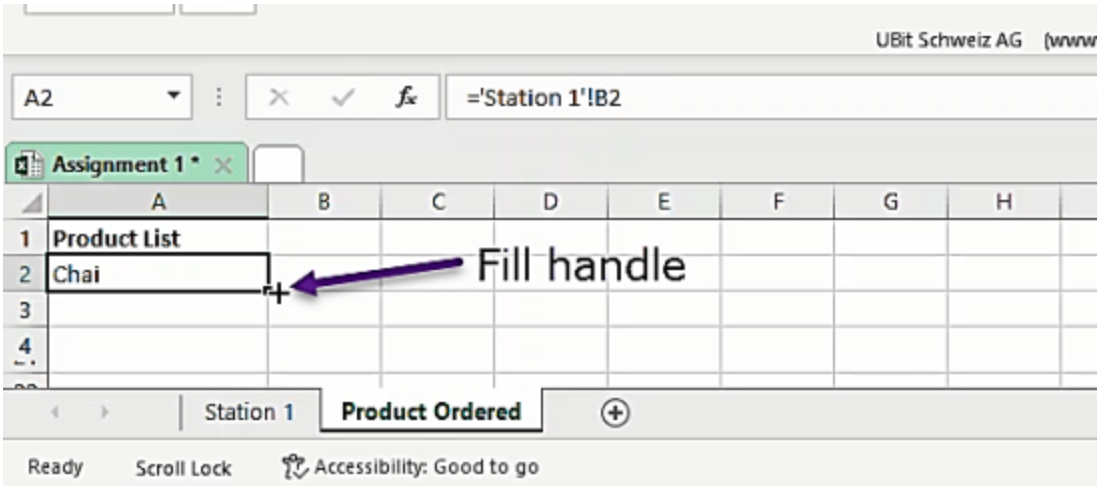
1. After confirming the reference, Press the **Enter** key, and Excel will return you to the destination (the **Product Ordered** sheet).
2. When you click cell **A2** on the **Product Ordered** sheet, the formula will appear on the formula bar.



You have successfully referred to another worksheet to get data without entering it manually.

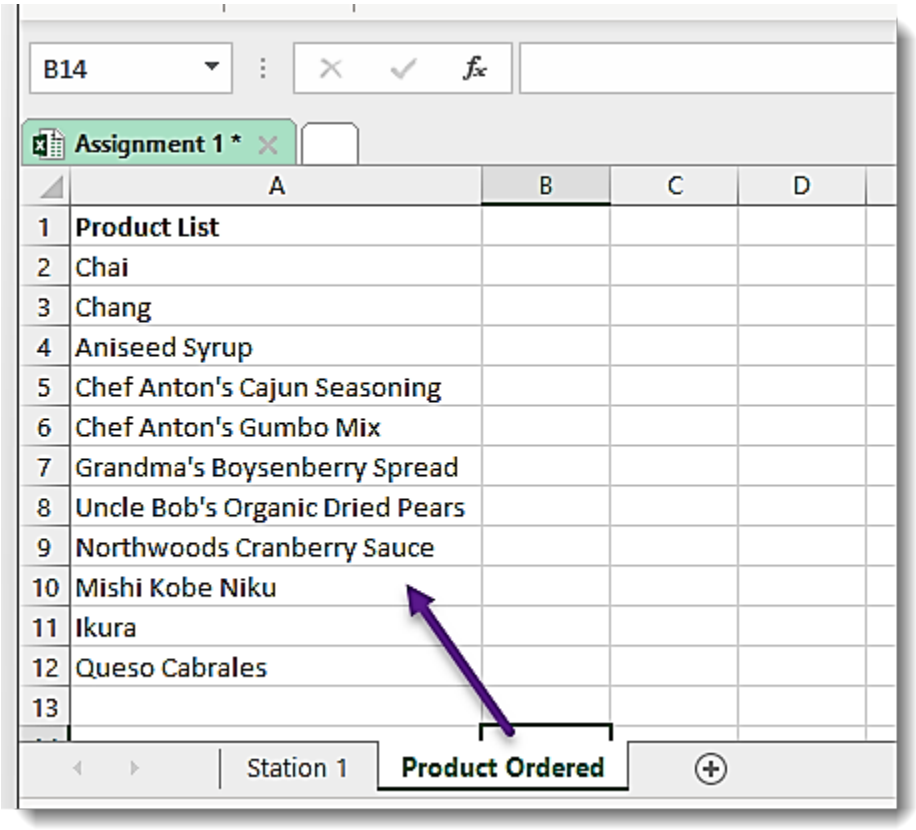
Even if the name of the source worksheet (**Station 1**) is changed, Excel will update the formula automatically with the new name.

1. Next, you click the fill handle on cell **A2** (on the **Product Ordered** worksheet), drag and fill the range of cells to copy the cell reference automatically.



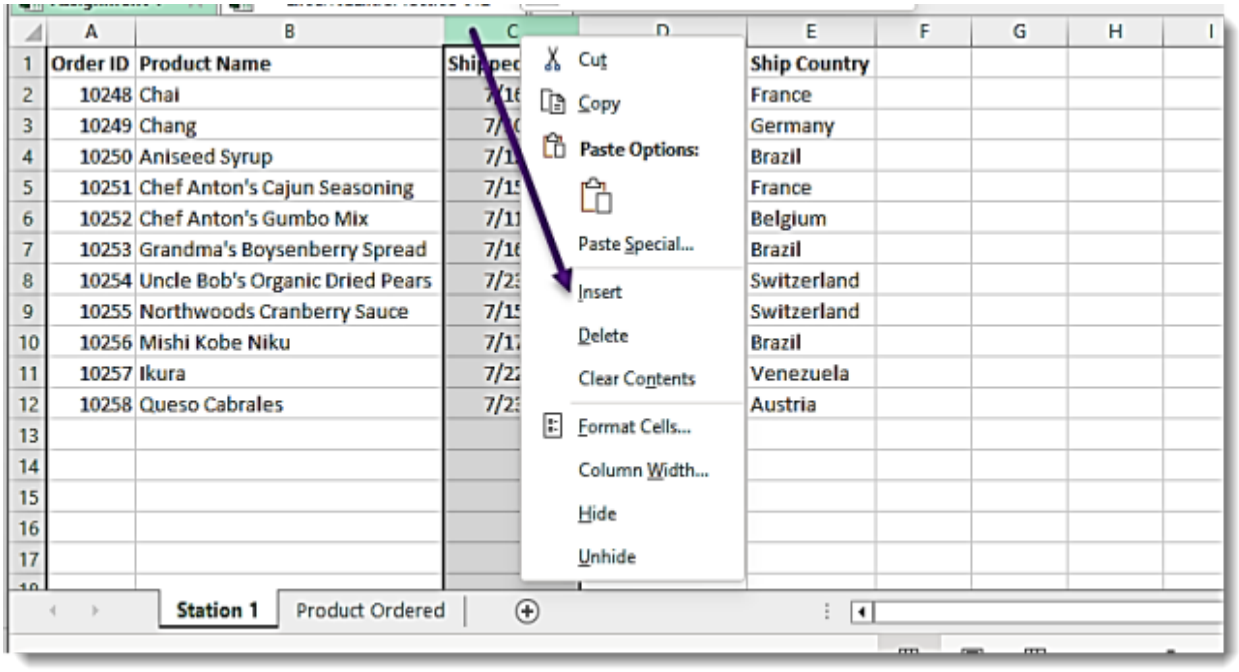
Drag the fill handle until all the data are captured. You can continue by dragging the fill handle of the last cell.

When done, you will see the same data you want to appear on both sheets.

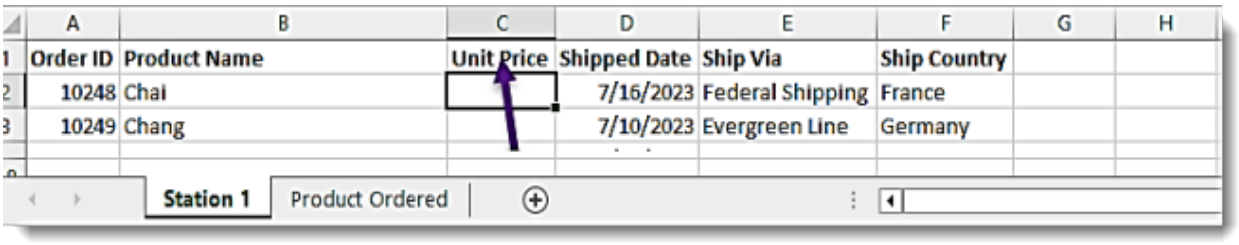


Let's try something again this time.

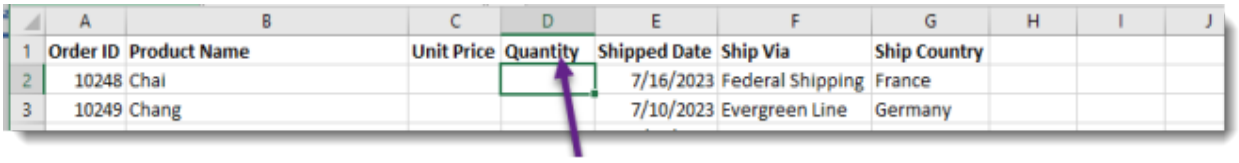
Go to the worksheet called **Station 1** and include the **Unit cost** for each product by inserting a new column in column **C,** as illustrated below.



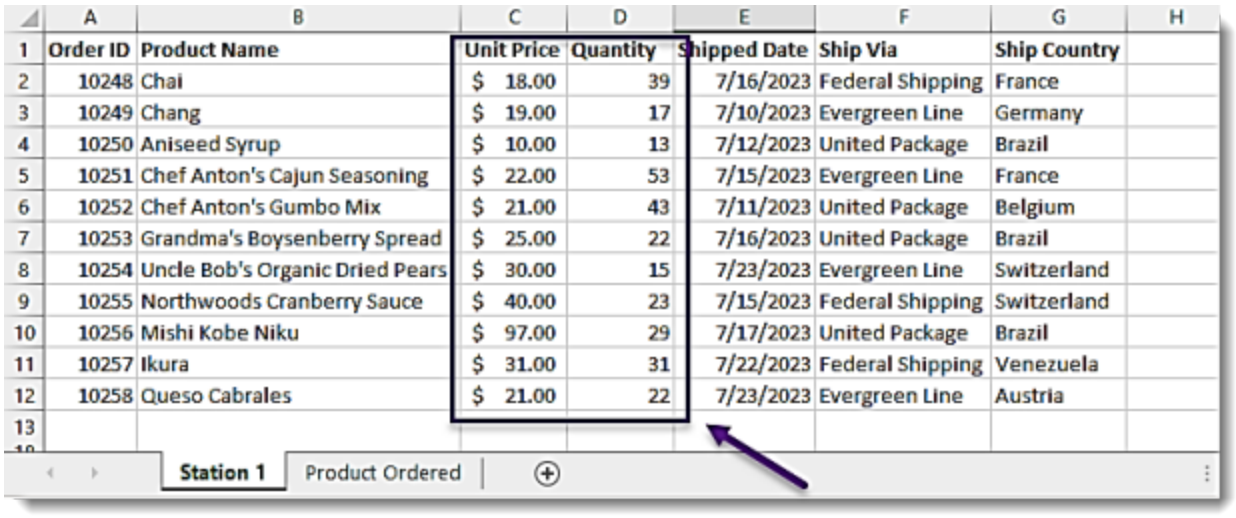
Let the heading be **Unit Price,** as illustrated below.



Insert another column as illustrated below and make the heading **Quantity.**



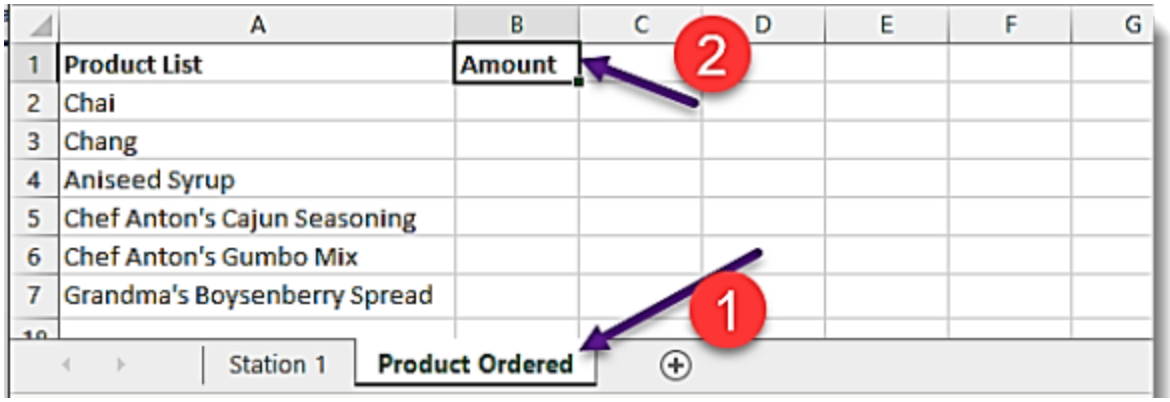
Finally, it should have numerical values and be formatted with currency symbols, as illustrated below.



	A	B	C	D	E	F	G	H
1	Order ID	Product Name	Unit Price	Quantity	Shipped Date	Ship Via	Ship Country	
2	10248	Chai	$ 18.00	39	7/16/2023	Federal Shipping	France	
3	10249	Chang	$ 19.00	17	7/10/2023	Evergreen Line	Germany	
4	10250	Aniseed Syrup	$ 10.00	13	7/12/2023	United Package	Brazil	
5	10251	Chef Anton's Cajun Seasoning	$ 22.00	53	7/15/2023	Evergreen Line	France	
6	10252	Chef Anton's Gumbo Mix	$ 21.00	43	7/11/2023	United Package	Belgium	
7	10253	Grandma's Boysenberry Spread	$ 25.00	22	7/16/2023	United Package	Brazil	
8	10254	Uncle Bob's Organic Dried Pears	$ 30.00	15	7/23/2023	Evergreen Line	Switzerland	
9	10255	Northwoods Cranberry Sauce	$ 40.00	23	7/15/2023	Federal Shipping	Switzerland	
10	10256	Mishi Kobe Niku	$ 97.00	29	7/17/2023	United Package	Brazil	
11	10257	Ikura	$ 31.00	31	7/22/2023	Federal Shipping	Venezuela	
12	10258	Queso Cabrales	$ 21.00	22	7/23/2023	Evergreen Line	Austria	
13								

Station 1 | Product Ordered

On the worksheet called **Product Ordered**, let the column heading be **Amount.**



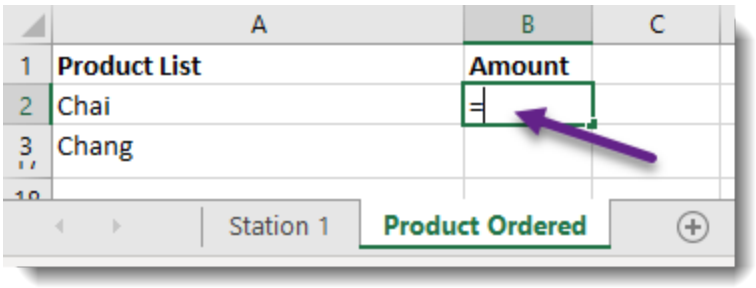
	A	B	C	D	E	F	G
1	Product List	Amount					
2	Chai						
3	Chang						
4	Aniseed Syrup						
5	Chef Anton's Cajun Seasoning						
6	Chef Anton's Gumbo Mix						
7	Grandma's Boysenberry Spread						

Station 1 | Product Ordered

Next, in cell **B2** of the **Product Ordered** Sheet, use the formula below to calculate the **Amount** for each product by referring to the **Unit Cost** and **Quantity** on the **Station 1** sheet.

To do this,

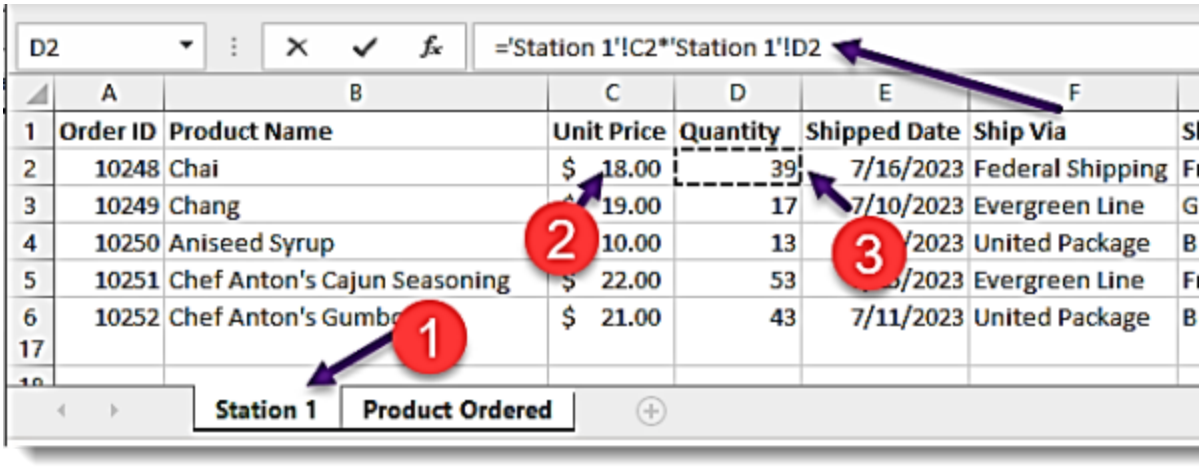
1. Enter the **equal sign** in cell **B2** of the **Product Ordered** Sheet.



1. With the cursor still in cell **B2** of the **Product Ordered** Sheet, click on the **Solution 1** sheet, click on cell **C2,** press the Multiplication symbol on your keyboard, and then click on cell **D2** on the same worksheet.

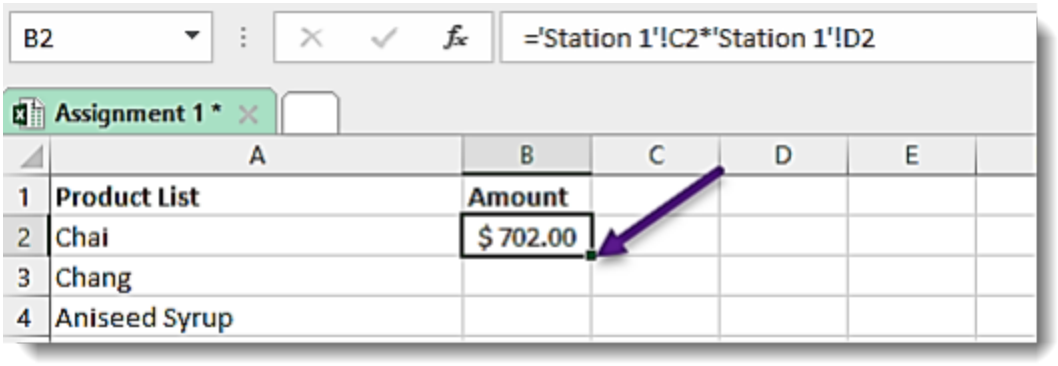
If done correctly, the formula below will appear on the formula bar.

='Station 1'!C2*'Station 1'!D2



Note the reference to cells **C2** and **D2** in the **Staton 1** worksheet.

1. Press the **Enter** key to return to the **Product Ordered** Worksheet. Then click the fill handle to drag and fill to cell **B12.**



REFERENCING ANOTHER WORKBOOK IN EXCEL

The way you reference a cell or range of cells in another Excel workbook depends on whether the Workbook in focus is open or closed and whether the workbook and worksheet names have spaces or non-alphabetic characters.

Here is a look at the different formats for referencing another workbook in different scenarios.

REFERENCING ANOTHER OPENED WORKBOOK

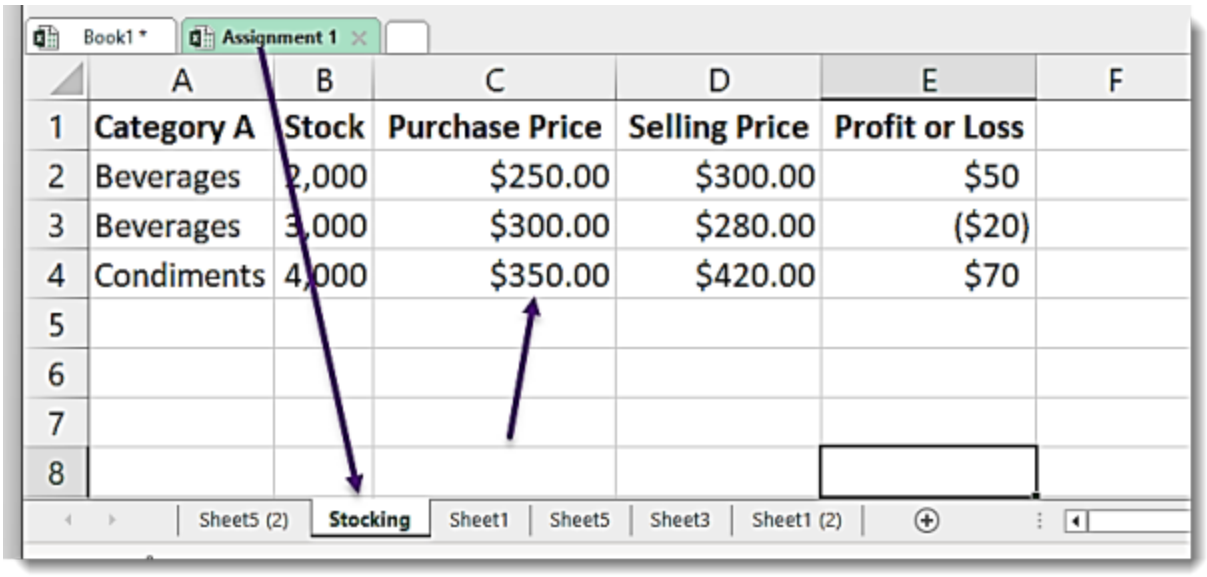
To reference another open Excel workbook, you must include the Workbook's name, the Worksheet's name, and the cell or range address.

The format for referencing an open Workbook is;

='[FileName]SheetName!CellAddress

Using the Workbook you must have created called '**Assignment1.xlsx**' and you want to reference cell **C4** in the Worksheet named **Stocking**, the reference would be as follows:

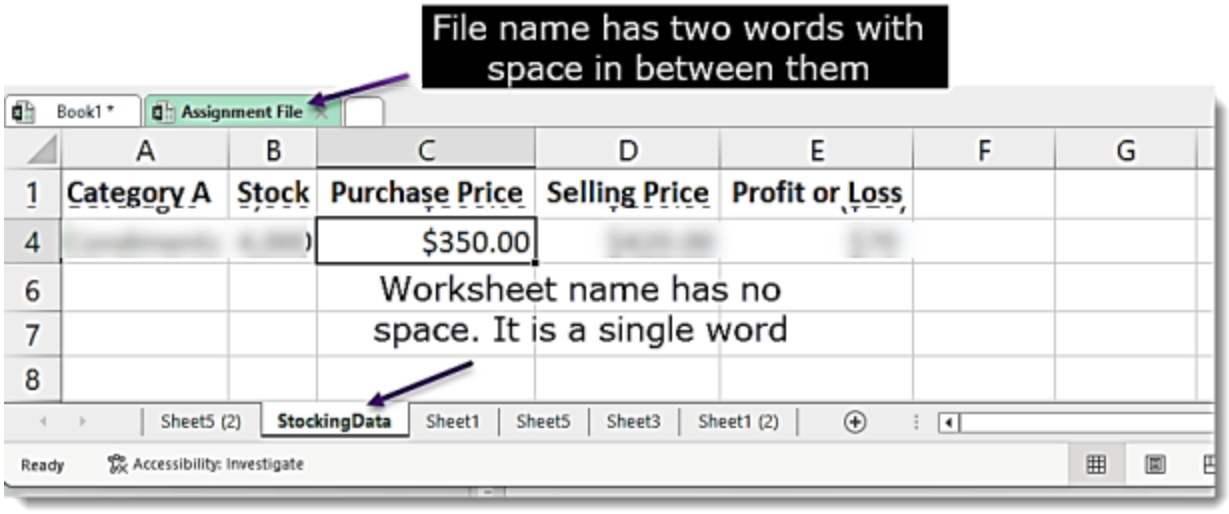
=[Assignment1.xlsx]Stocking!C4



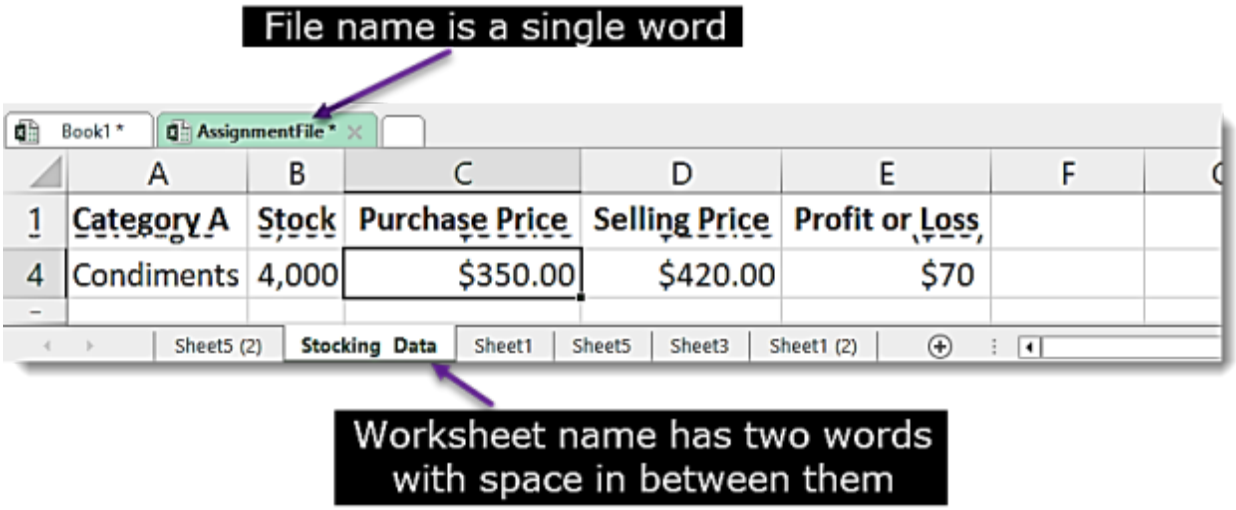
If the name of the external Workbook or the Worksheet (or both) contains spaces, you must enclose the file name in square brackets and put the sheet name in single quotes.

Here is an example of using single quotes:

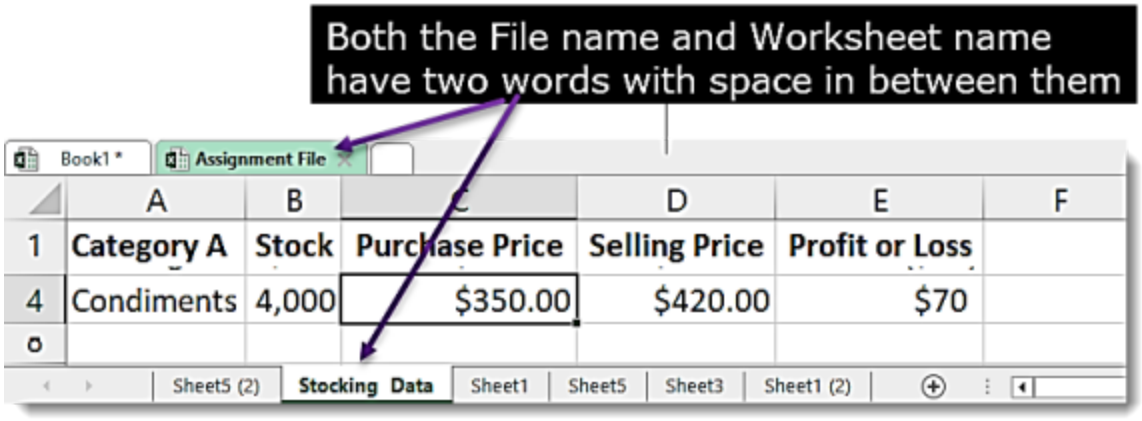
='[Asignment Work.xlsx]StockingData'!C4



='[AssingmentFile.xlsx]Stocking Data'!C4



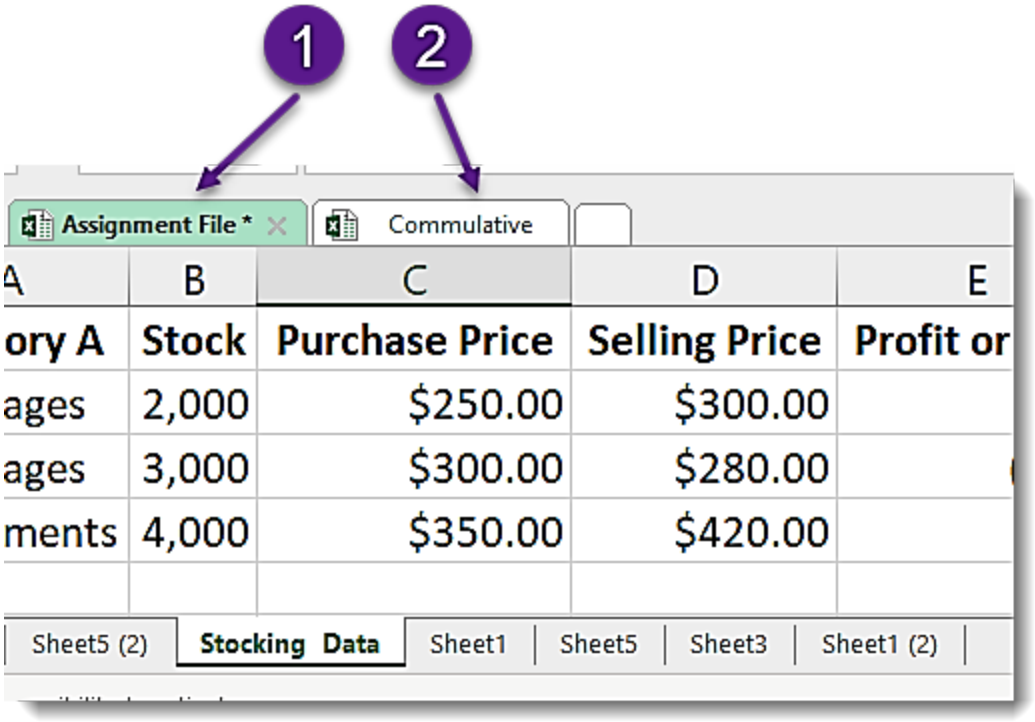
='[Assignment File.xlsx]Stocking Data'!A1



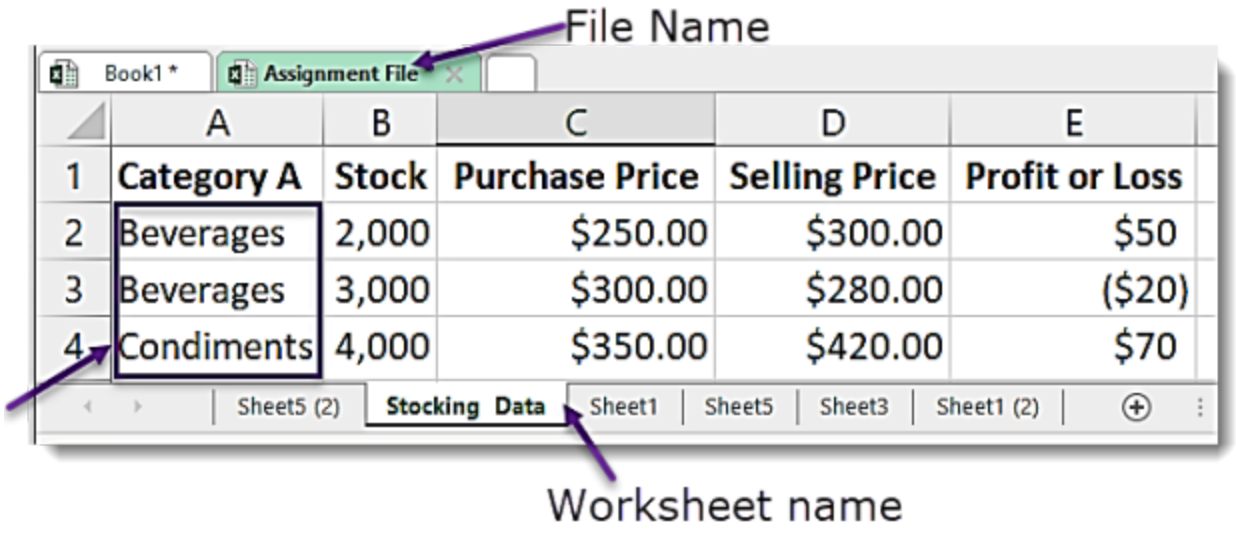
AUTOMATICALLY REFERENCING ANOTHER OPENED WORKBOOK

As previously discussed, using the automatic method to reference a Workbook points excel directly in the direction it will take to create a reference without you entering it manually.

Here is an example of how to retrieve the **data** in cells **A2**:**A4** of a Worksheet named '**Stocking Data**' in a Workbook called '**Assignment File**' in the current Workbook called '**Cummulative**':

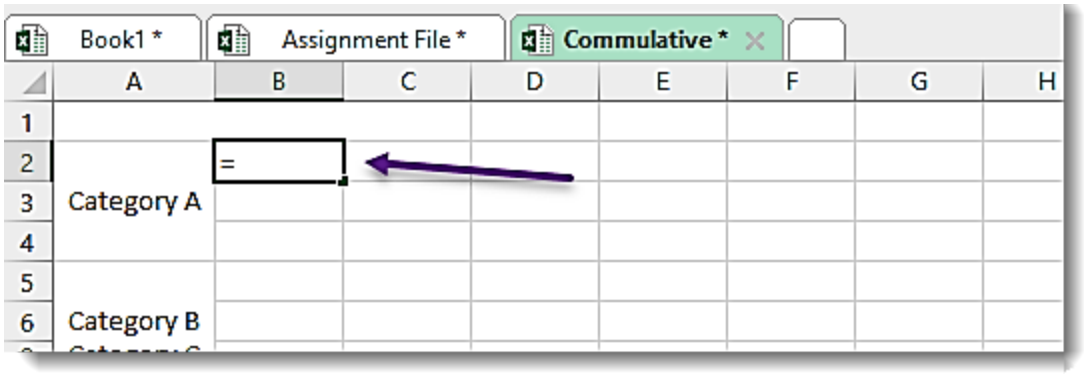


Both Workbooks are running on the system.

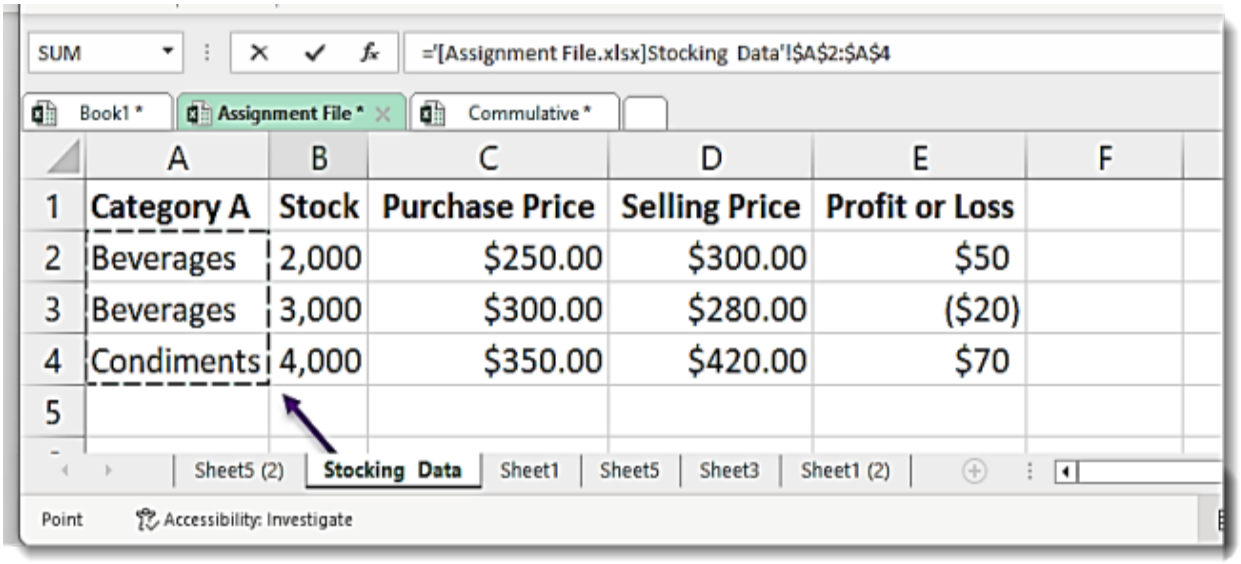


	A	B	C	D	E
1	Category A	Stock	Purchase Price	Selling Price	Profit or Loss
2	Beverages	2,000	$250.00	$300.00	$50
3	Beverages	3,000	$300.00	$280.00	($20)
4	Condiments	4,000	$350.00	$420.00	$70

Go to the destination Workbook and type the formula in the cell. In this case, the destination Workbook is called '**Cummulative**', and the formula is to be entered in cell **B2**.

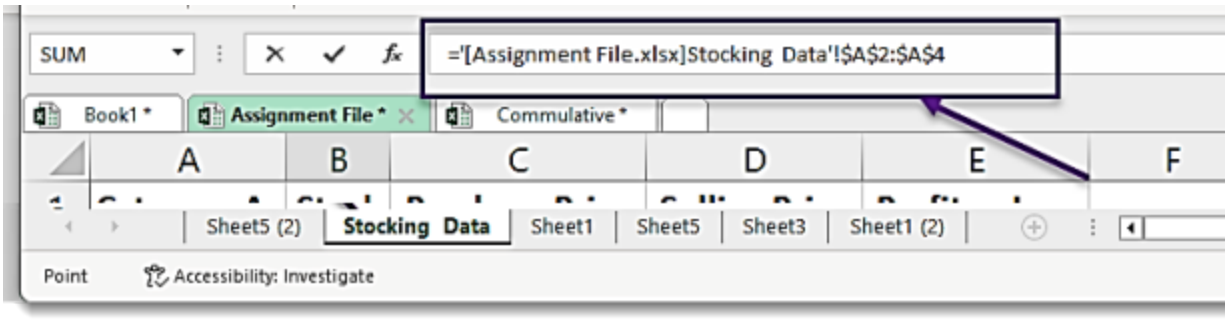


After typing the equal sign, use your mouse to click on the reference Workbook, ' **Assignment File**', and select the range **A2:A4**.

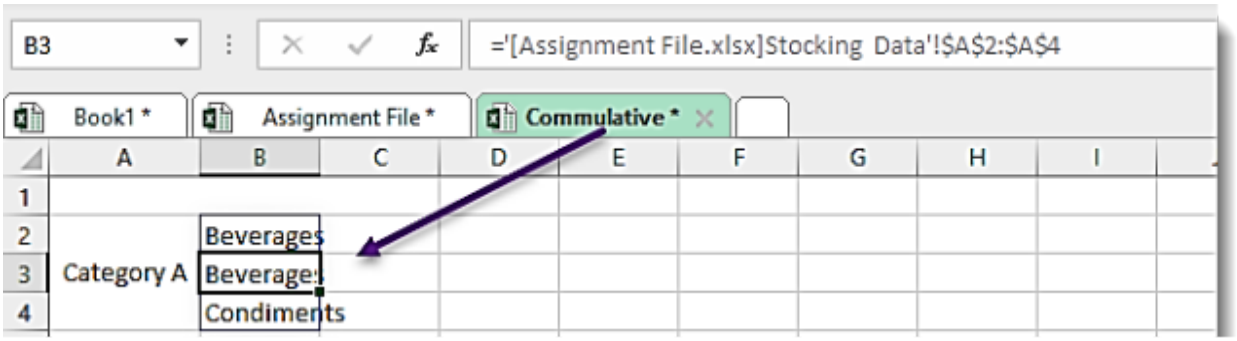


	A	B	C	D	E
1	Category A	Stock	Purchase Price	Selling Price	Profit or Loss
2	Beverages	2,000	$250.00	$300.00	$50
3	Beverages	3,000	$300.00	$280.00	($20)
4	Condiments	4,000	$350.00	$420.00	$70
5					

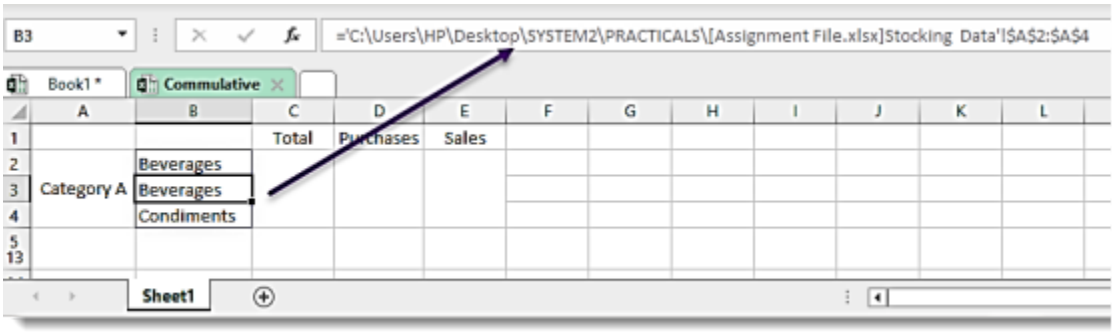
Automatically, the formula bar will display the formula Excel created to reference the Workbook and its Worksheet and the range of cells.



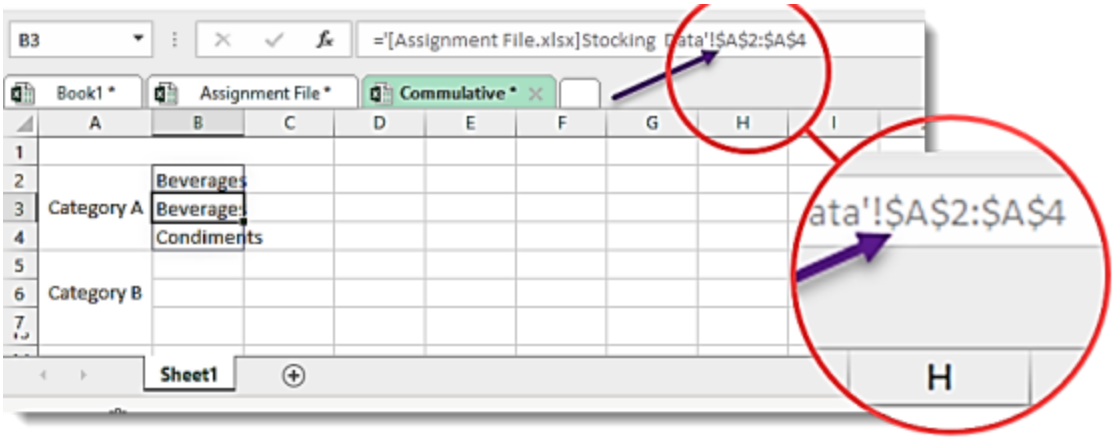
Press the **Enter** key to complete the process, and immediately you will be redirected to the destination Workbook.



You can close the referenced Workbook, and your formula will remain intact. When you click on the affected cell(s), the formula bar will display the destination file and the formula.



Remember that when you create a reference to another workbook, the reference will always be an **absolute** reference, indicated by the $ sign before the row and column numbers.



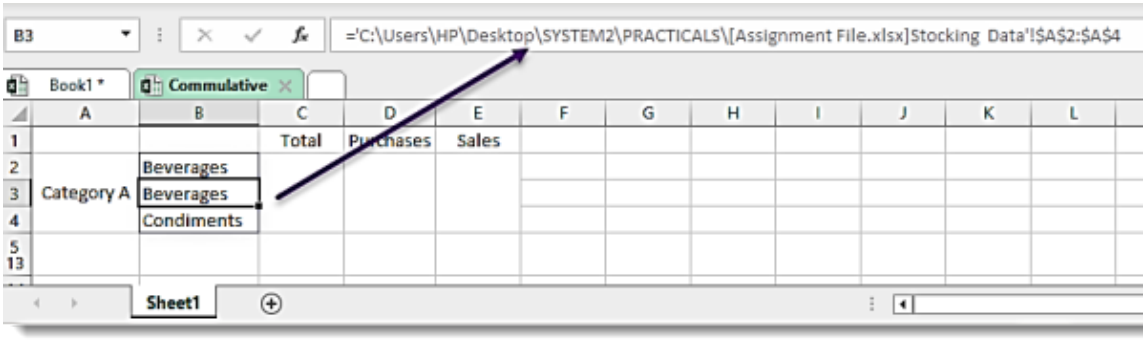
This means that if you copy and paste the formula containing the reference, it will always refer to the same range (it is absolute) rather than updating to a new range relative to the new location of the formula.

If you want the references to be relative rather than absolute, you must manually change them.

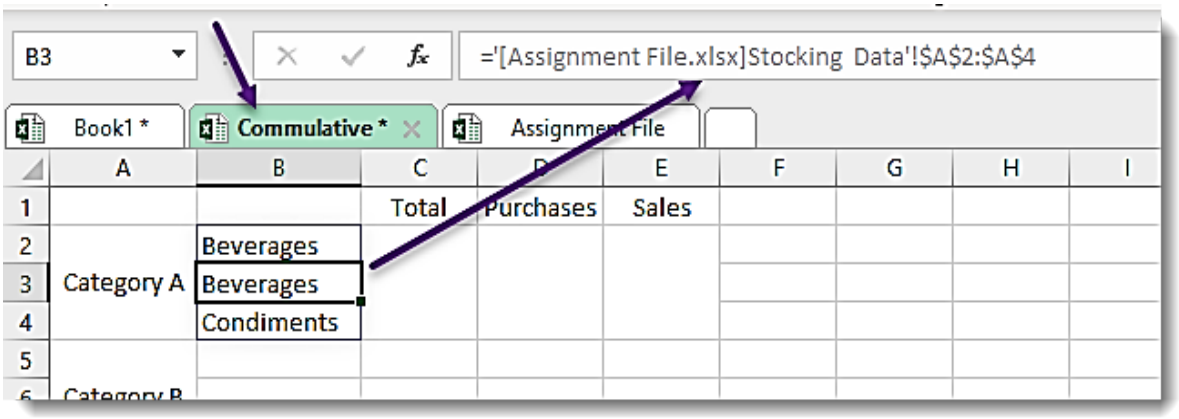
REFERENCING A CLOSED WORKBOOK

The best way to stay safe referencing a closed Workbook is to open the External Workbook, create the reference, and close the External Workbook when done.

As explained earlier, the formula bar will give you a clue about the source cells or range you referred to.



When you open the Workbook, you will notice the Formula bar does not display the file path.

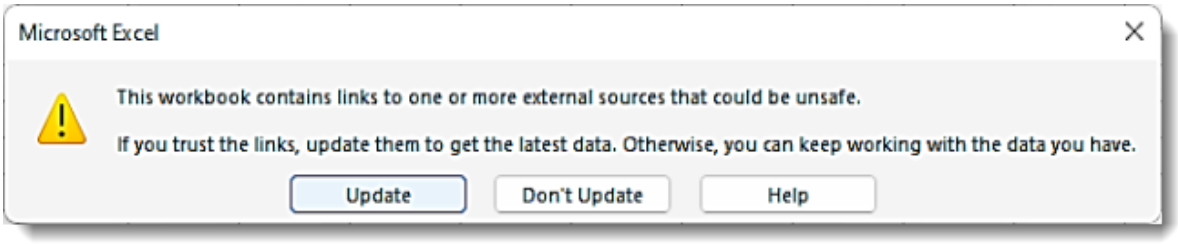


You are only presented with the file name, Sheet name, and cell range address. When you close the external Workbook, Excel automatically includes a reference to its file path.

However, if you move the external file to a new location on your system or network, your Workbook's reference will not reflect the new file path. This will

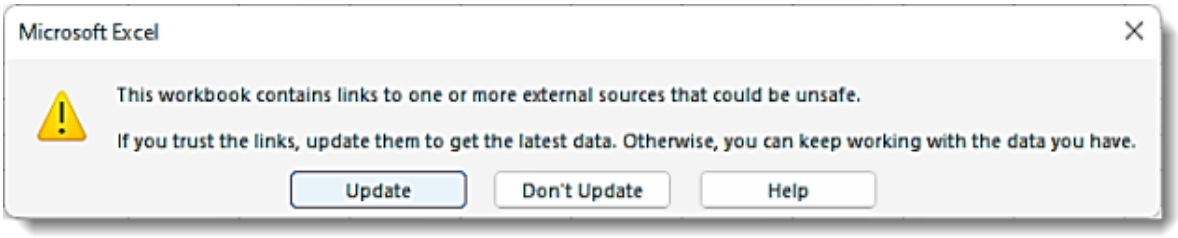
cause the link to break because the reference is no longer valid.

If you close and reopen the Workbook containing the reference to the external file, you may see a prompt stating that the link is broken and asking you to either update the link or continue.



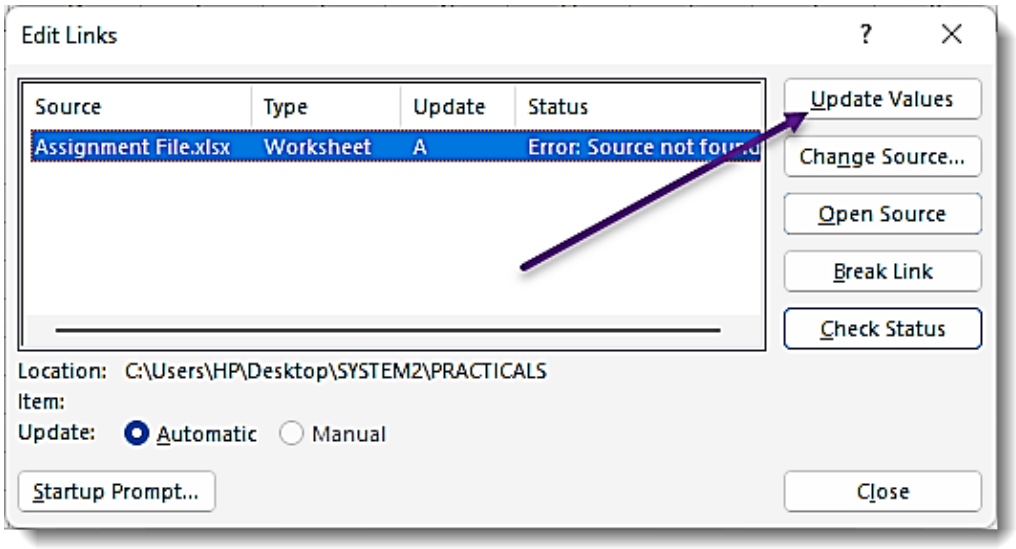
If you click the "**Update**" button, you will see another prompt that allows you to choose options for editing the links.

Updating a Broken Reference Link to an External Workbook



If you click the "**Update**" button, you will see another prompt that allows you to choose options for editing the links.

Click on the **Update values** button to locate the external file on your device.


Edit Links
Source
Type
Update
Status
Assignment File.xlsx
Worksheet
A
Update Values
Change Source...
Open Source
Break Link
Check Status
Location: C:\Users\HP\Desktop\SYSTEM2\PRACTICALS
Item:
Update: Automatic Manual
Startup Prompt...
Close

LESSON 8

INTRODUCTION TO EXCEL FUNCTIONS

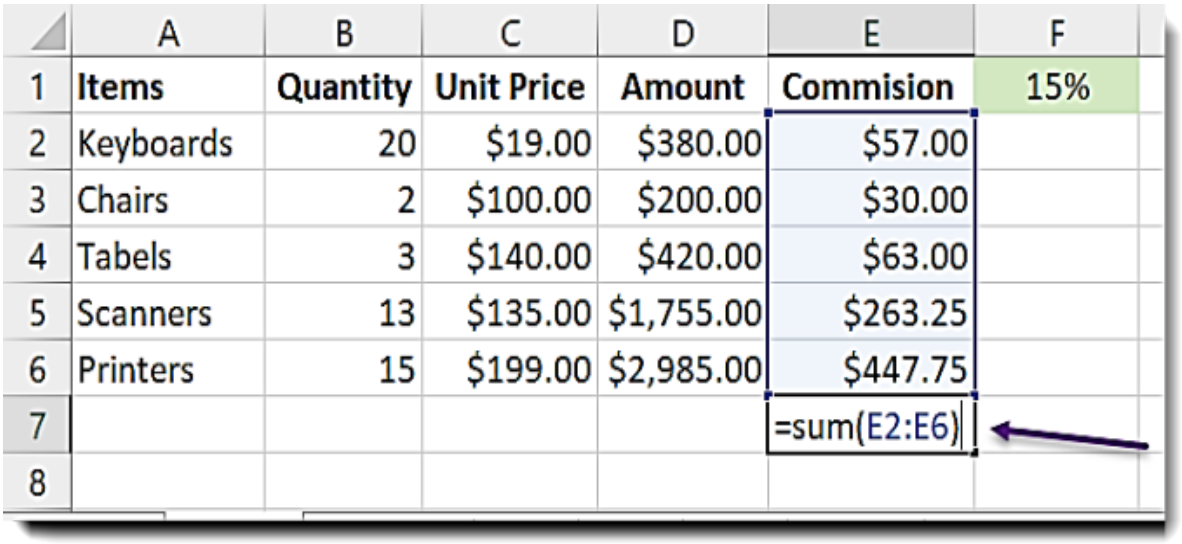
DEFINITION OF EXCEL FUNCTIONS

Excel functions are a set of **pre-defined formulas** that can complete a range of calculations or tasks within a Worksheet. They are a vital component of Microsoft Excel and are used to speed up tasks and minimize spreadsheet management and data analysis mistakes.

In Excel, a formula is an expression that works with values in one or more cells. For example, the formula =**E2+E3+E4+E5+E6** calculates the sum of the values in cells **E2** through **E6**.

Functions in Excel quickly perform calculations without having to enter the formulas manually. They are given **human-readable names** to make them easier to understand.

For example, the function =**SUM(E2**:**E6)** calculates the sum of the values in cells **E2** through **E6**.



	A	B	C	D	E	F
1	**Items**	**Quantity**	**Unit Price**	**Amount**	**Commision**	15%
2	Keyboards	20	$19.00	$380.00	$57.00	
3	Chairs	2	$100.00	$200.00	$30.00	
4	Tabels	3	$140.00	$420.00	$63.00	
5	Scanners	13	$135.00	$1,755.00	$263.25	
6	Printers	15	$199.00	$2,985.00	$447.75	
7					=sum(E2:E6)	
8						

Functions can save time and reduce the risk of errors when working with formulas in Excel.

Hundreds of Excel functions are available, each with a particular purpose, such as the SUM, AVERAGE, MAX, MIN, and IF functions. Other types of

functions include Text functions, Logical functions, Date and Time functions, and Lookup and Reference functions.

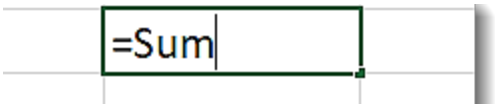
Excel functions are a helpful tool for anyone who frequently works with spreadsheets. They allow you to perform calculations, manipulate text, and find and reference data efficiently in your spreadsheet.

By learning how to use them, you can save time and improve the accuracy of your data analysis and spreadsheet management tasks.

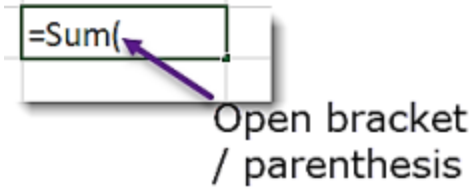
HOW TO USE EXCEL FUNCTIONS IN A WORKSHEET

To use an Excel function, open your Worksheet in Microsoft Excel and select the cell where you want to enter the function.

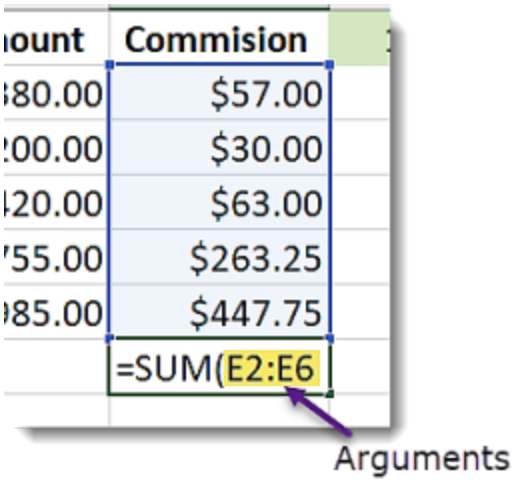
Type the equal sign =, followed by the function name.



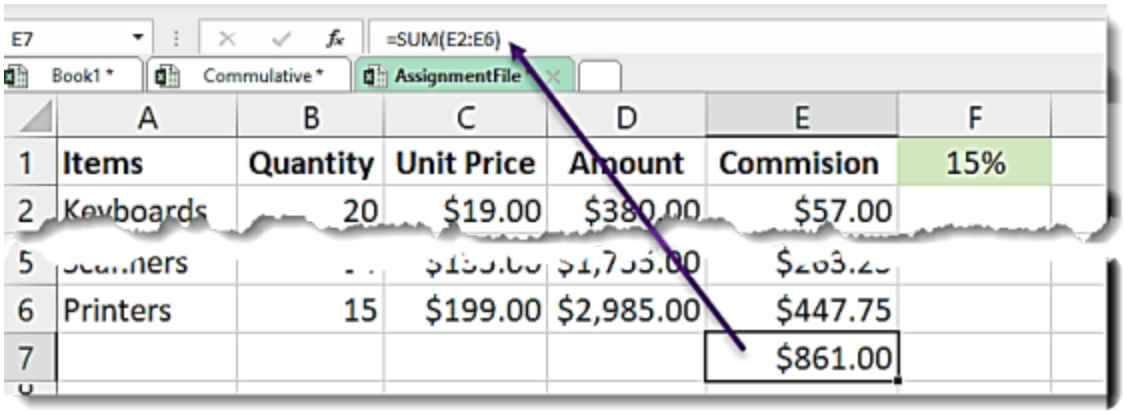
Next, you enter an **Open parenthesis**,



Then, you enter the required arguments for the function, which can be cell references, constants, or both.



Close the parenthesis and press the **Enter** key to complete the process.



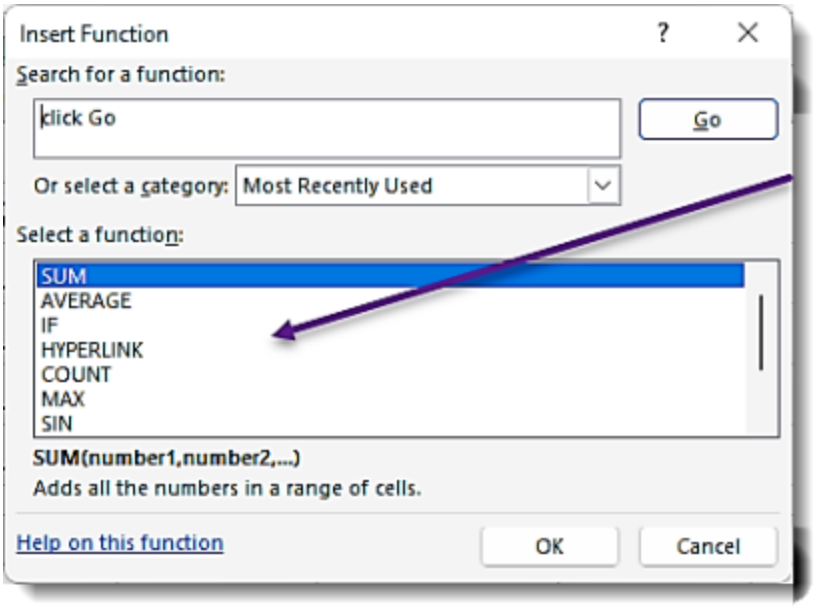
The result will appear in the selected cell. With practice, you can become proficient in using a variety of Excel functions.

INSERTING FUNCTIONS FROM THE FORMULAS TAB

To manually access the **Insert Function** dialog box, go to the **Formulas tab** and click on the **Insert Function** option in the **Function Library** group.



A list of all Excel functions will appear in the dialog box, enabling you to complete your financial analysis.

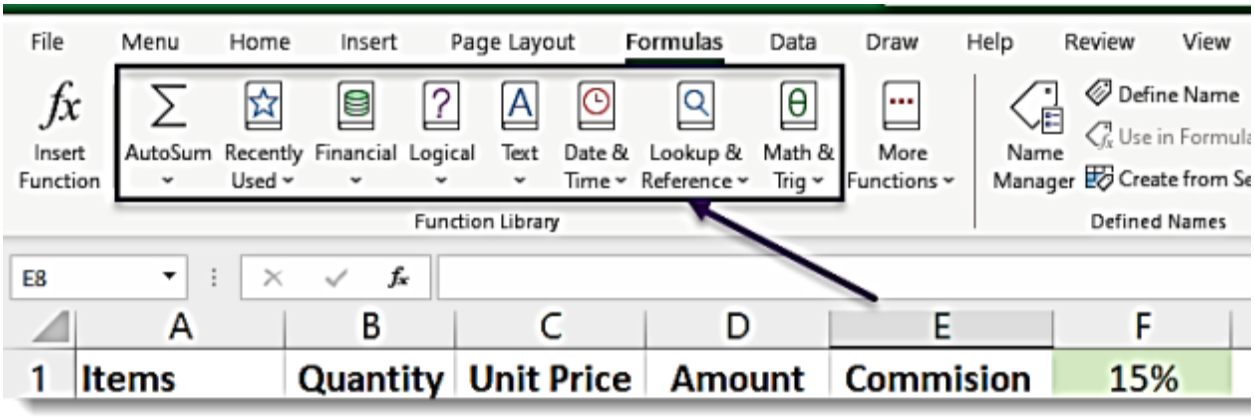


This gives you complete control over the function that was inserted and lets you select from all of Excel's functions.

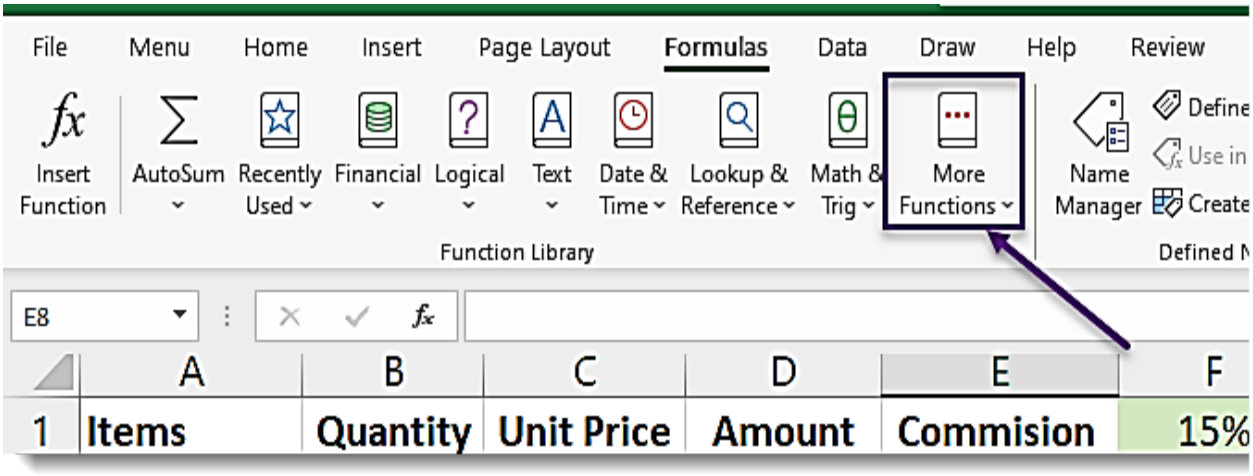
CHOOSING A FORMULA IN THE FORMULA TAB

To quickly access a function you are familiar with in Excel, you can use the **Formula** tab to navigate to the group containing that function and select it from the list of functions within that group.

To do this, go to the Formulas tab and click on the appropriate group. This will display a sub-menu with a list of functions within that group. Click on the function you want to insert into the active cell.

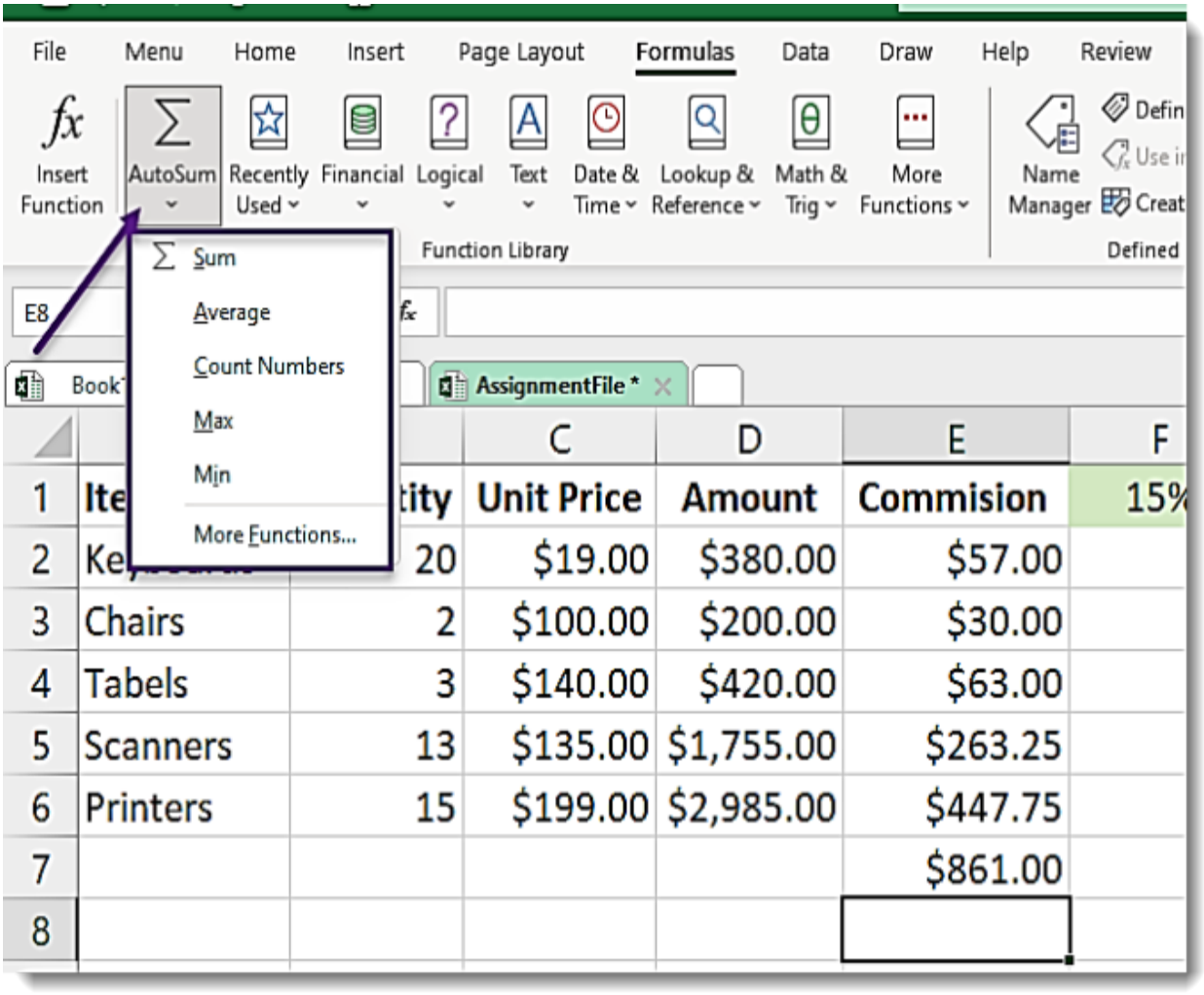


If you do not see the group containing the function you want to use on the Formulas tab, click on the More Functions option to access a broader range of functions.

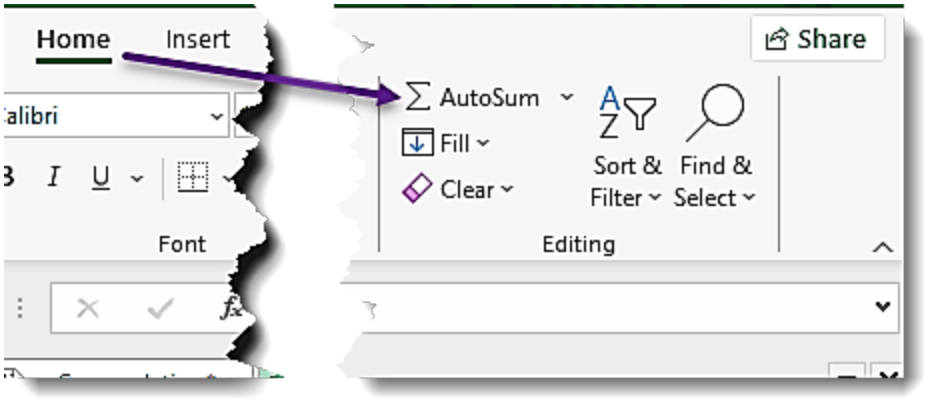

File
Menu
Home
Insert
Page Layout
Formulas
Data
Draw
Help
Review
Insert Function
AutoSum
Recently Used
Financial
Logical
Text
Date & Time
Lookup & Reference
Math & Trig
More Functions
Function Library
Name Manager
Define
Use in
Create
Defined N
E8
A
B
C
D
E
F
1
Items
Quantity
Unit Price
Amount
Commision
15%

THE AUTOSUM OPTION

The AutoSum function is a quick and easy option for everyday tasks in Excel. To use it, go to the **Formulas tab** and click on the **AutoSum** Command button.

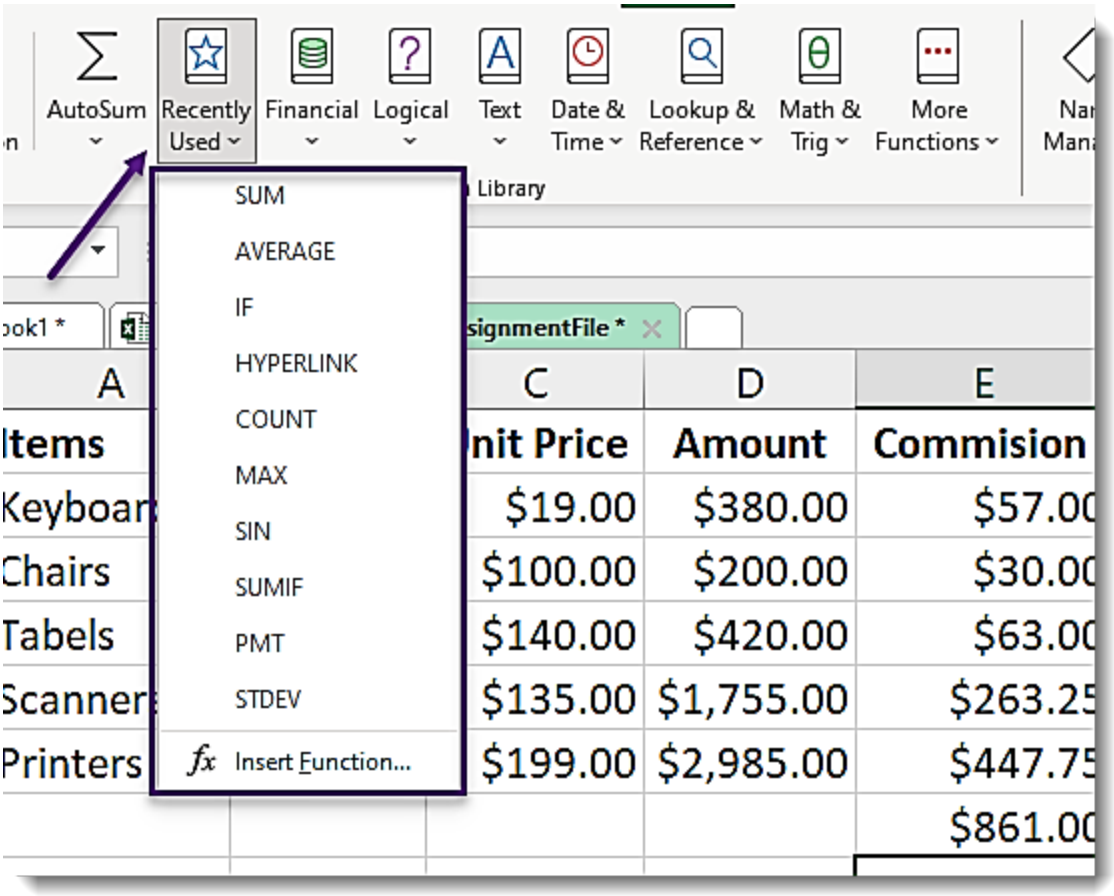


This will insert the AutoSum function into the active cell. The AutoSum function is also available in the Home tab.


Home
Insert
Share
AutoSum
Fill
Clear
Sort &
Filter
Find &
Select
Font
Editing

QUICK ACCESS TO RECENTLY USED FUNCTIONS

To avoid re-treating your most recent formula, you can use the **Recently Used** command located on the **Formulas tab** next to **AutoSum**.



COMMONLY USED MATHEMATICAL AND STATISTICAL FUNCTIONS

Another way to perform mathematical calculations in Excel is by using functions. Statistical functions apply a mathematical operation to a set of cells in a worksheet. For instance, the **SUM** function earlier discussed adds values within a range of cells.

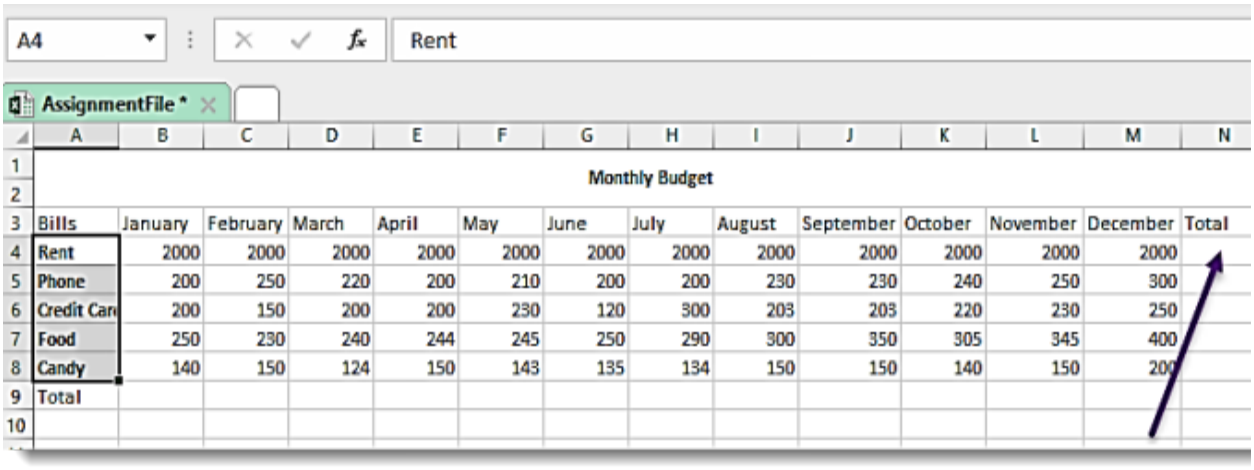
Functions are more efficient than formulas when applying a mathematical operation to multiple cells. If you were to use a formula to add the values in a range of cells, you would have to add each cell to the formula. This can be time-consuming if there are many cells. However, with a function, you can highlight all the cells containing values you want to add in one step. This section will demonstrate various statistical functions and also cover calculating the percent of the total and using absolute references in a Budget workbook.

SUM FUNCTION

The SUM function is a key formula to learn in Excel. It allows you to add together a range of cells from different rows and columns

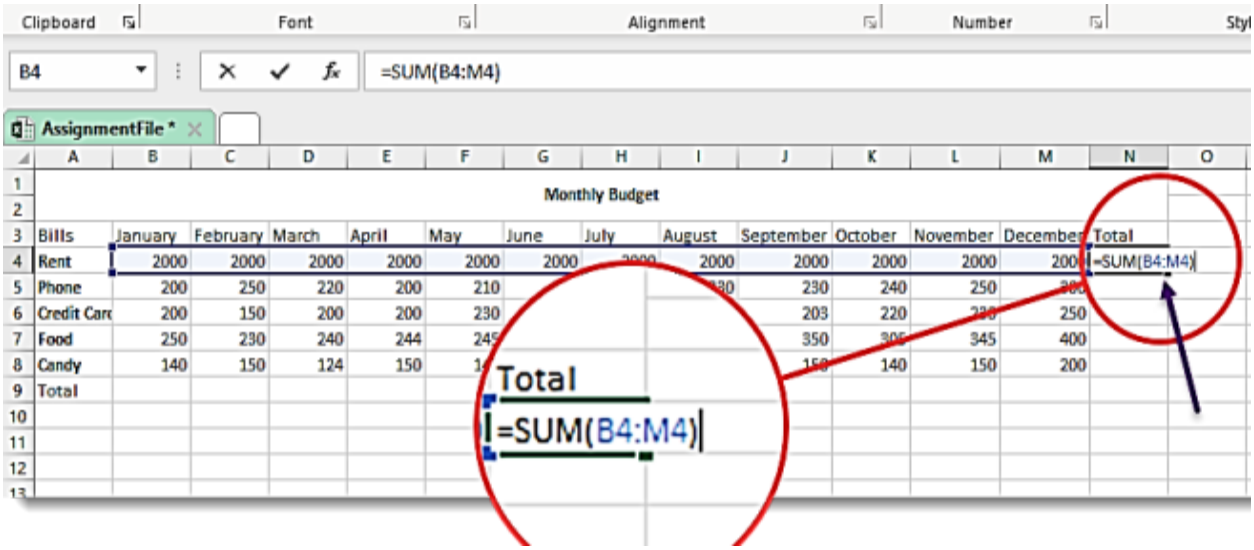
on a worksheet.

The **Monthly Budget** worksheet illustration below uses the **SUM** function to find the totals in cell **N4**.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1														
2														
3	Bills	January	February	March	April	May	June	July	August	September	October	November	December	Total
4	Rent	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	
5	Phone	200	250	220	200	210	200	200	230	230	240	250	300	
6	Credit Car	200	150	200	200	230	120	300	203	203	220	230	250	
7	Food	250	230	240	244	245	250	290	300	350	305	345	400	
8	Candy	140	150	124	150	143	135	134	150	150	140	150	200	
9	Total													
10														

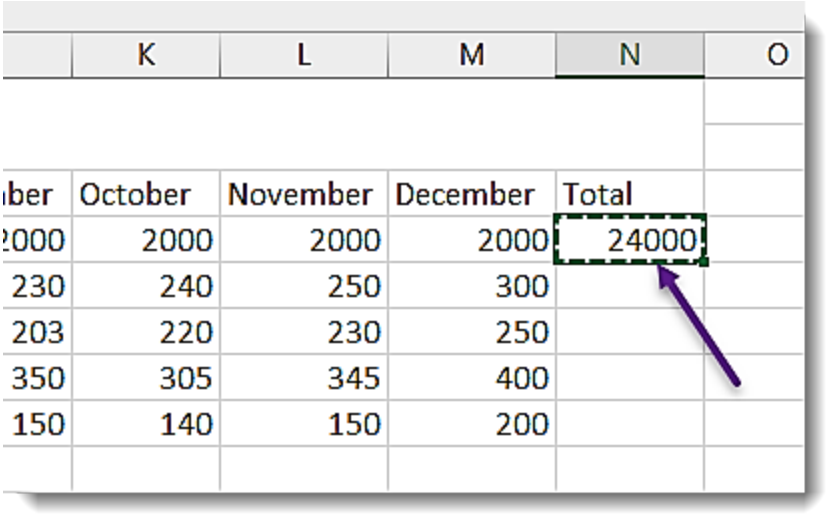
As demonstrated below, adding a function to a worksheet can be accomplished through various methods, including typing it into a cell.



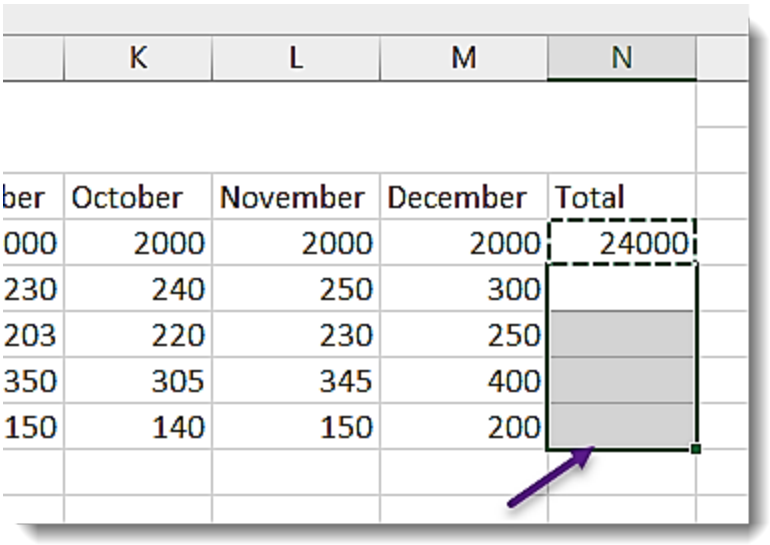
The illustration above shows that the **SUM function** was used in cell **N4**.

However, it is also necessary to calculate the totals in the **Phone** row down to the **Candy** row. The function in cell **N4** can be copied and pasted into these cells due to relative referencing. Relative referencing serves the same purpose for functions as it does for formulas.

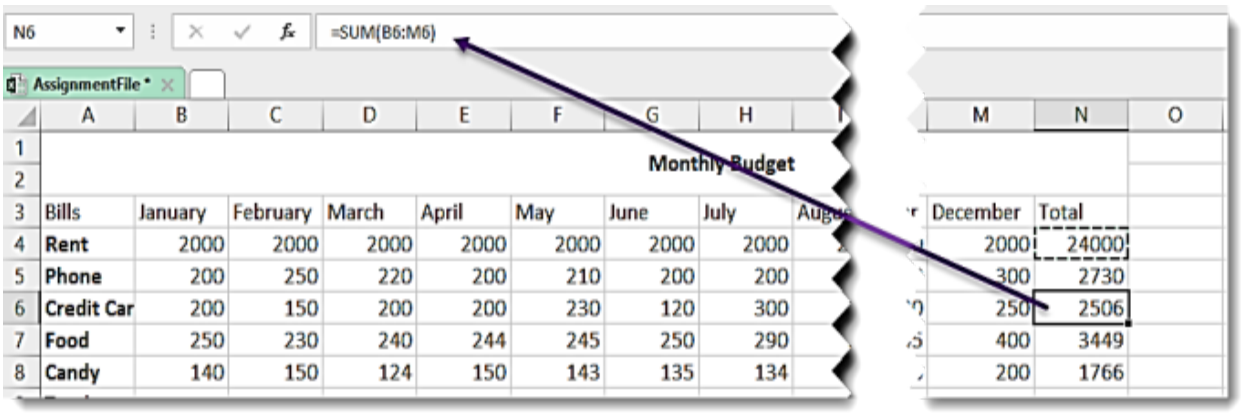
Select the cell with the function you want to copy and press **Ctrl** + **C.**



Next, highlight all the cells you want to paste the formula and press **Ctrl** + **V**.

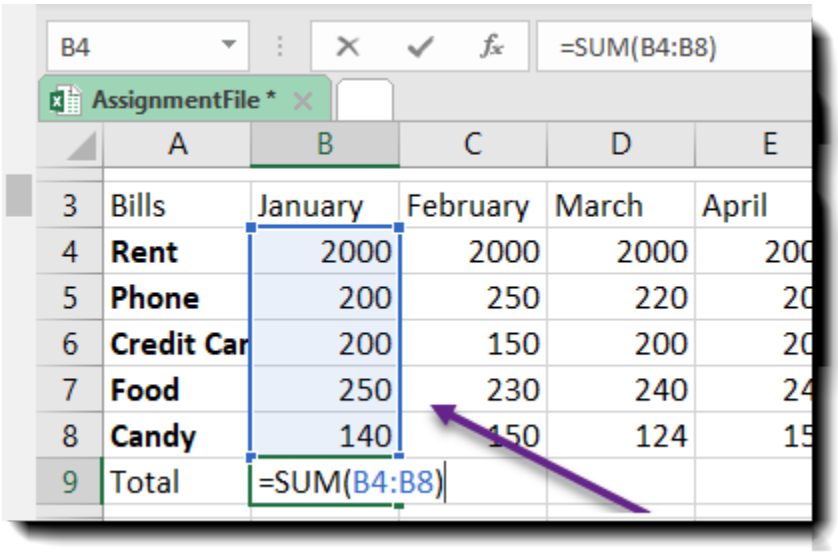


The output in cells **N5** to **N8** shows the SUM function copied and adjusted.

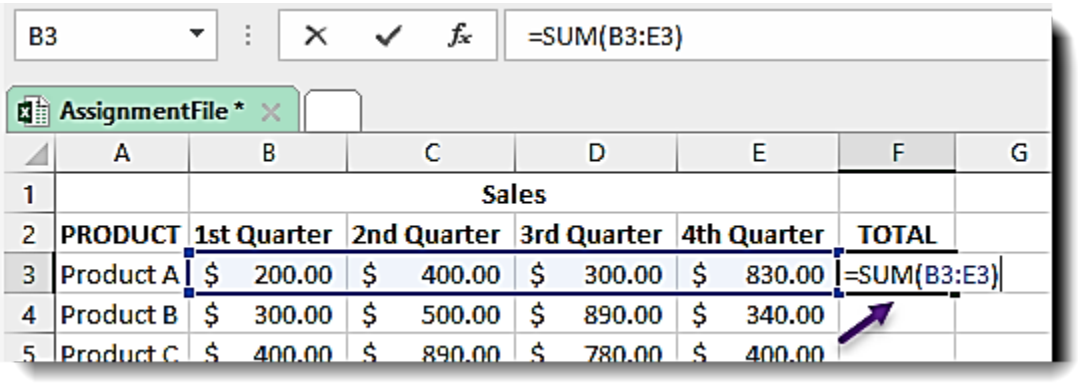


More examples of SUM function;

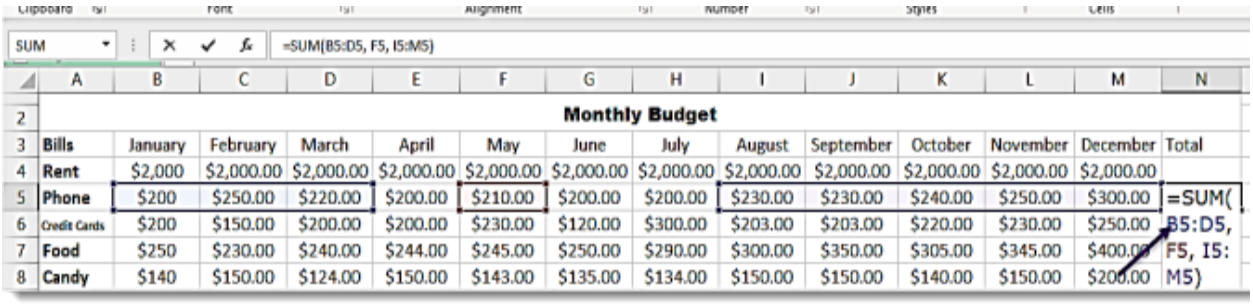
=SUM(**B4**:**B8**) A selection that consists of adding the values of a range of cells on a column in a spreadsheet.



=SUM(**B3**:**E3**) A selection that consists of adding the values of a range of cells on a **ROW** in a spreadsheet.



=SUM(**B5**:**D5**, **F5**, **I5**:**M5**) A complex selection involves adding the values from cells **B5** to **D5**, skips **E5**, adds **F5**, jumps **G5** and **H5**, then finally adds from **I5** to **M5**.



When you apply a statistical function to a range of cells in a spreadsheet, it's advisable to separate the cells with a colon instead of a comma. If you use a comma, the function will only be applied to two cells instead of the entire range.

For example, using the **SUM** function with cell locations separated by a comma, such as **B5**, **D5**, will only add the values in those two cells. But using a colon, like B5**:**D5, the **SUM Function** will add the values from cell **B5** to **D5**, which is **B5 + C5 + D5**.

AVERAGE FUNCTION

The AVERAGE function in Excel is one of the most commonly used statistical functions that allow users to quickly determine the average of a range of cells in a worksheet.

The syntax for using the AVERAGE function is as follows:

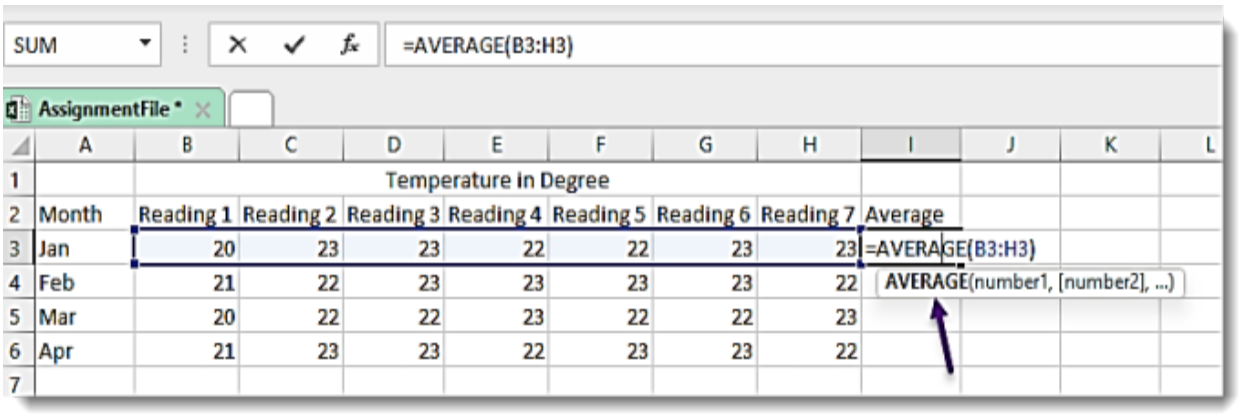
AVERAGE(number1, [number2], ...)

"**number1**" represents the first cell or range of cells for which an average should be calculated.

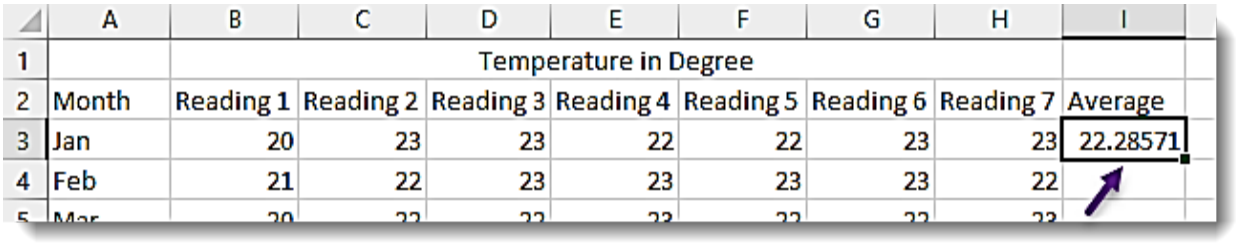
Adding more cell ranges or individual cells may also be included as optional arguments, separated by commas.

In the example below, you have a range of cells **B3**:**H3** with numeric values; the **AVERAGE** function calculates the average of these values by entering the formula below into the cell **I3**

=AVERAGE(**B3**:**H3**)



The function then returns the average values in cells **B3** to **H3**.

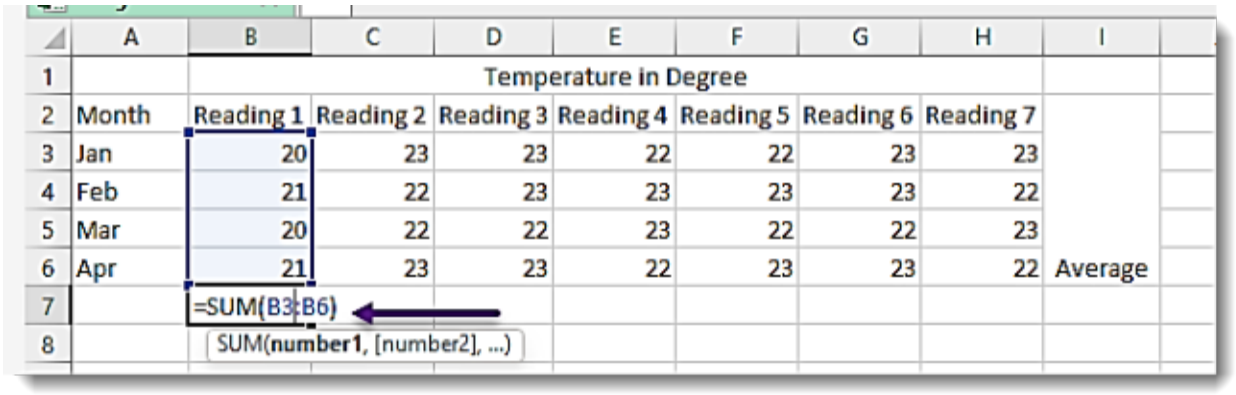


	A	B	C	D	E	F	G	H	I
1		Temperature in Degree							
2	Month	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	Average
3	Jan	20	23	23	22	22	23	23	22.28571
4	Feb	21	22	23	23	23	23	22	

The AVERAGE function ignores empty or text-filled cells, so don't use it on those. Cells with FALSE or TRUE logical values will also be ignored.

You can also use the AVERAGE function to determine the average of the results of other Excel functions besides the Average of a range of cells.

A simple example below shows a range of cells **B3** to **B6** added up using the **SUM** function and then calculating the **Average** using the **AVERAGE** function.

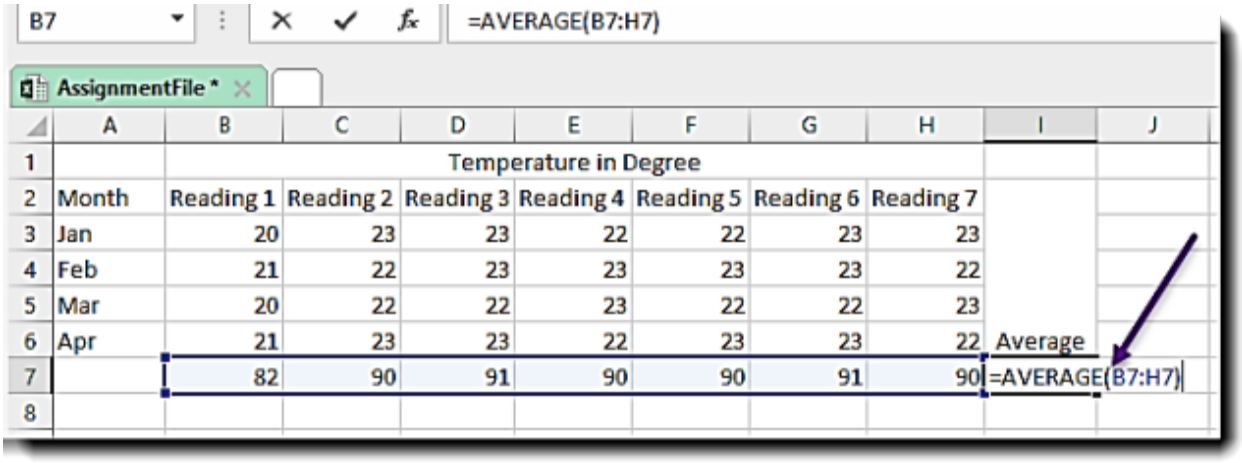


	A	B	C	D	E	F	G	H	I
1		Temperature in Degree							
2	Month	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	
3	Jan	20	23	23	22	22	23	23	
4	Feb	21	22	23	23	23	23	22	
5	Mar	20	22	22	23	22	22	23	
6	Apr	21	23	23	22	23	23	22	Average
7		=SUM(B3:B6)							
8		SUM(**number1**, [number2], ...)							

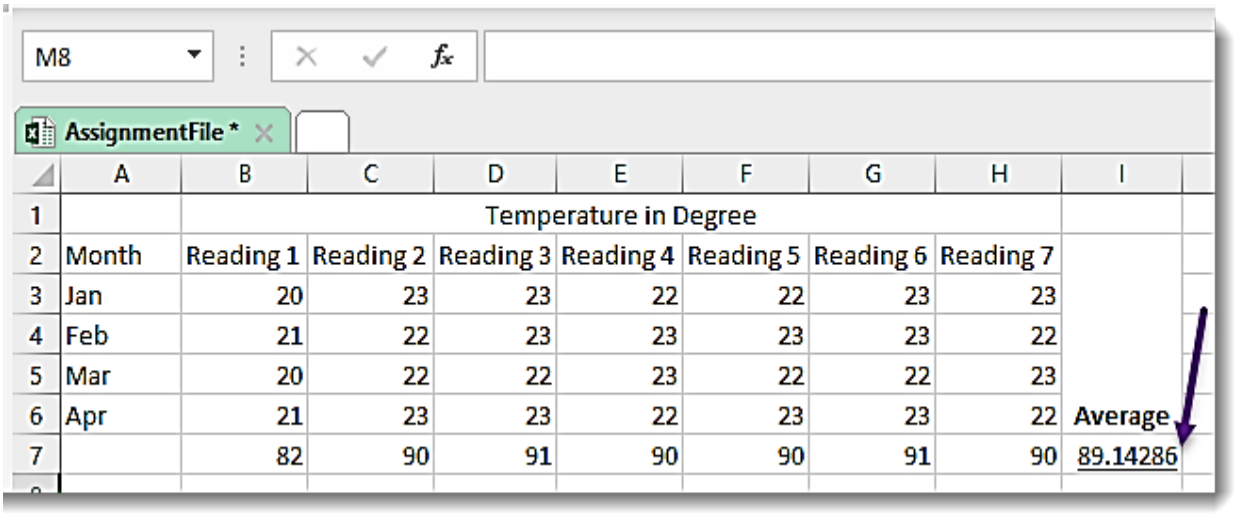
The formula in cell **B7** is copied and pasted into cell **C7** to **H7.**

	A	B	C	D	E	F	G	H	I
1		Temperature in Degree							
2	Month	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	
3	Jan	20	23	23	22	22	23	23	
4	Feb	21	22	23	23	23	23	22	
5	Mar	20	22	22	23	22	22	23	
6	Apr	21	23	23	22	23	23	22	Average
7		82	90	91	90	90	91	90	
8									
9									

Next, the Average function is used in the cell **I7,** to compute the average values in cell **B7** to **H7.**



The function then returns the Average values in cells **B7** to **H7**, which contains the SUM functions.



Generally, the **AVERAGE** function is useful in finding the Average of a range of cells in a spreadsheet. This tool is user-friendly and can be useful in analyzing data and making decisions.

AVERAGEIF FUNCTION

With Excel's AVERAGEIF function, you can calculate a range of cells' average values based on a specified condition or a single value based on a range of cells when a particular condition is met. A good application of this function would be if you have a large dataset and want to find the average value for a particular subset of data within that dataset.

AVERAGEIF has the following syntax:

AVERAGEIF(range, criteria, [average_range])

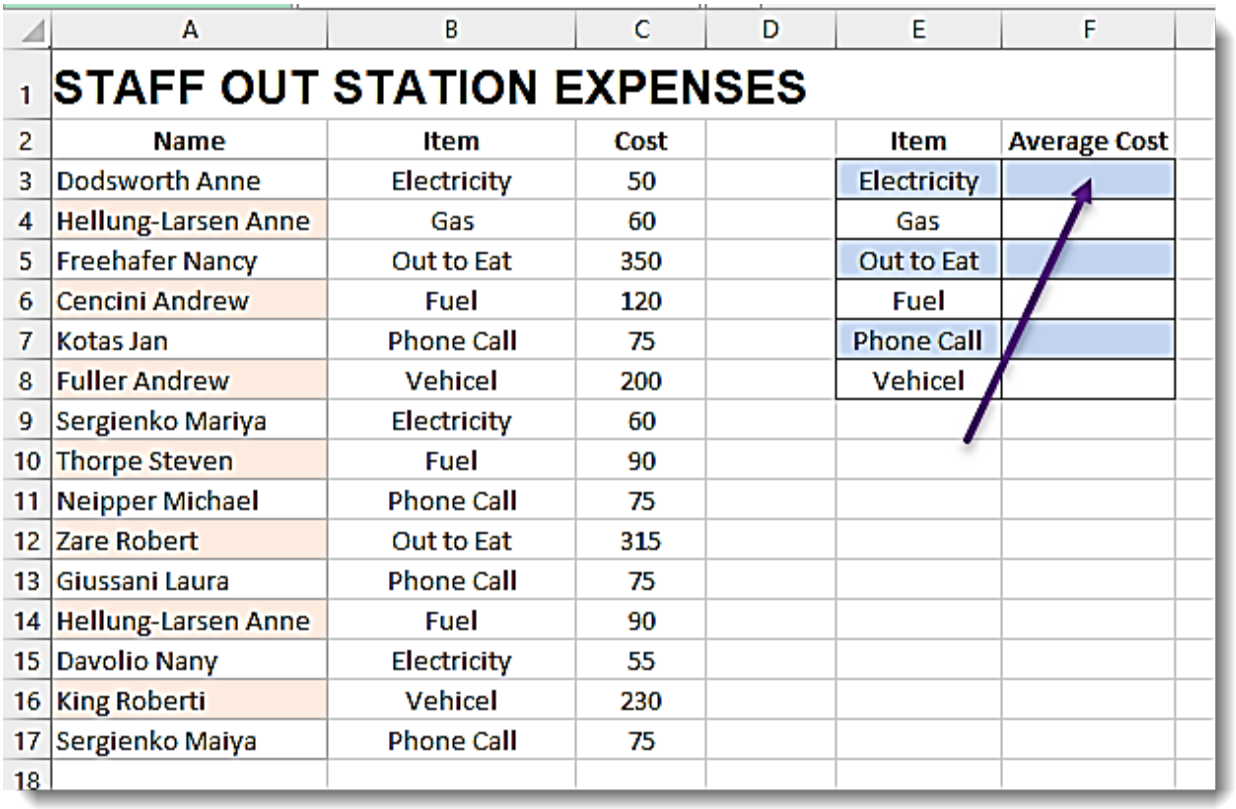
A **range** argument specifies the range of cells to which the criteria should be applied.

The **criteria** argument specifies the conditions that must be met for a cell to be included in the average.

In the **average_range argument**, specify the range of cells you wish to average.

In the absence of this argument, Excel uses the range argument.

For example, in a **Staff Out-Station Expenses** worksheet illustrated below, the **AVERAGEIF** function is used to find the average base on a Specific **ITEM**, such as **Electricity**.



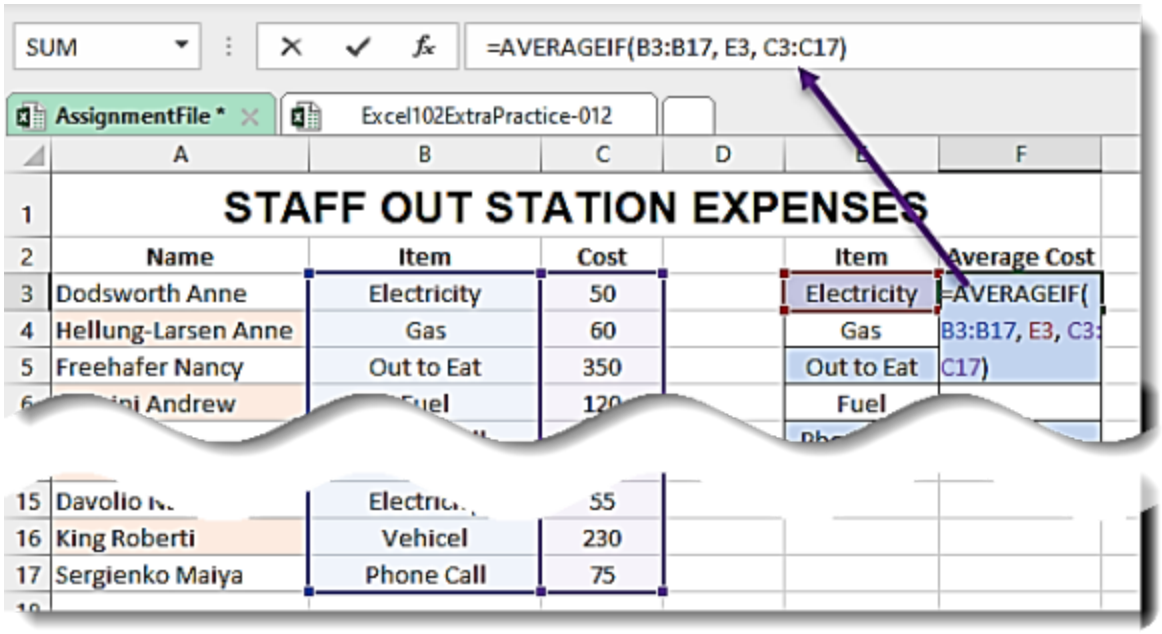
	A	B	C	D	E	F
1	STAFF OUT STATION EXPENSES					
2	Name	Item	Cost		Item	Average Cost
3	Dodsworth Anne	Electricity	50		Electricity	
4	Hellung-Larsen Anne	Gas	60		Gas	
5	Freehafer Nancy	Out to Eat	350		Out to Eat	
6	Cencini Andrew	Fuel	120		Fuel	
7	Kotas Jan	Phone Call	75		Phone Call	
8	Fuller Andrew	Vehicel	200		Vehicel	
9	Sergienko Mariya	Electricity	60			
10	Thorpe Steven	Fuel	90			
11	Neipper Michael	Phone Call	75			
12	Zare Robert	Out to Eat	315			
13	Giussani Laura	Phone Call	75			
14	Hellung-Larsen Anne	Fuel	90			
15	Davolio Nany	Electricity	55			
16	King Roberti	Vehicel	230			
17	Sergienko Maiya	Phone Call	75			
18						

This function enables you to specify a range of cells **B3:B17** containing the **Items** and **Criteria** cell **F3** containing the specific **Item** as a condition required for the **Average-range argument** in cells **C3:C17**.

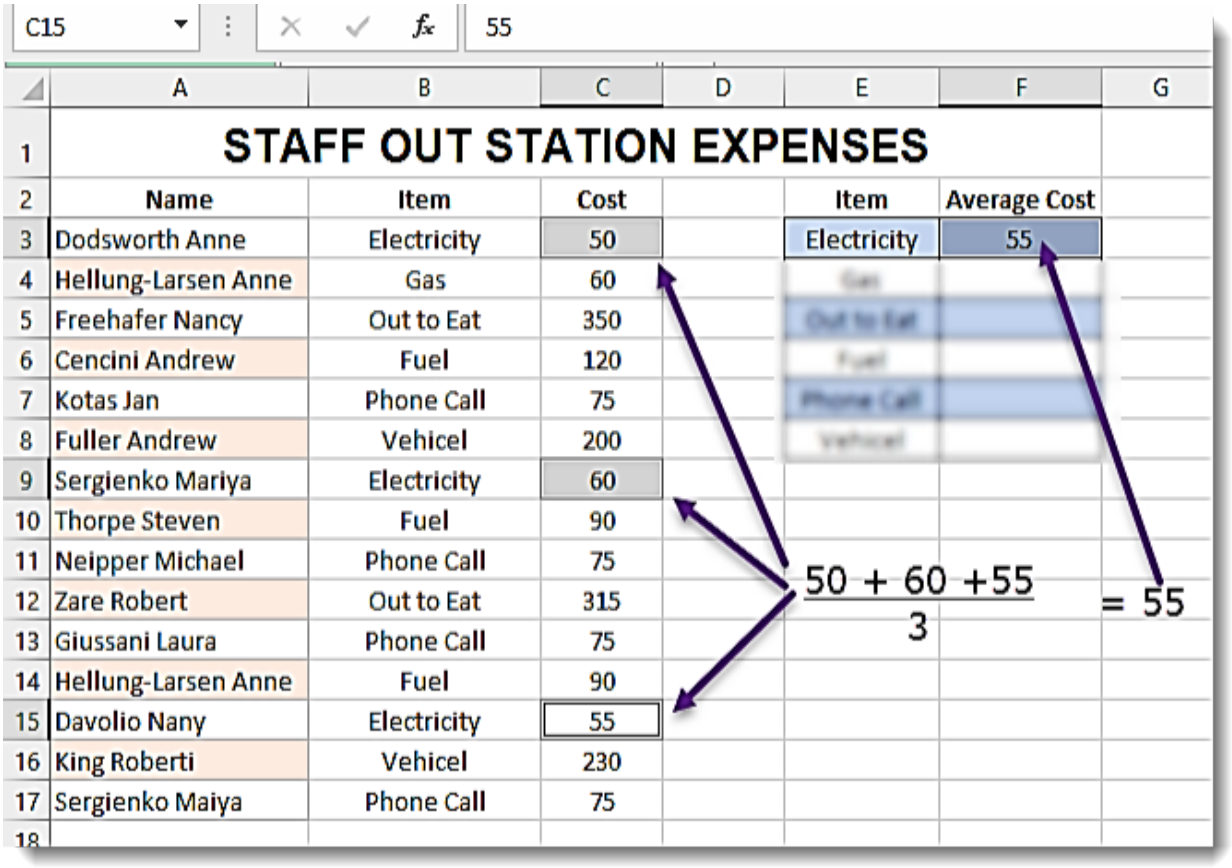
So as illustrated below, the formula is entered into cell **F3.**

We use the formula;

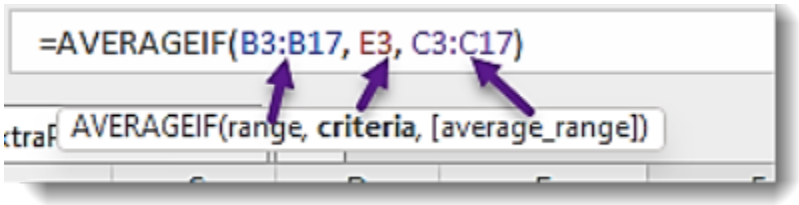
=**AVERAGEIF**(**B3**:**B17**, **E3**, **C3**:**C17**)



The formula would find the average COST of all the Items called **Electricity** in the range **C3:C17**.



This means **Electricity** is the **Criterion** that is fulfilled.



If you have several **Criteria** in a large dataset, you must make the cell reference **Absolute** for the **Range** and **Average-range argument**.

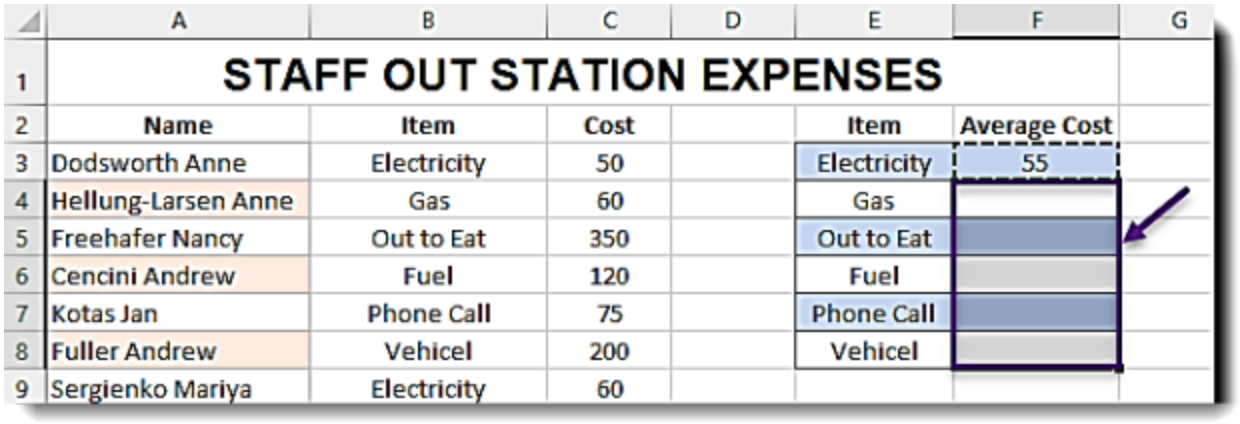
That means the formula will now be;

=**AVERAGEIF**(**B$3**:**B$17**, **E3**, **C$3**:**C$17**)

The dollar sign was not added to the **Criteria** cell **E3**, because it will remain relative when you copy and paste the formula. For a large dataset,

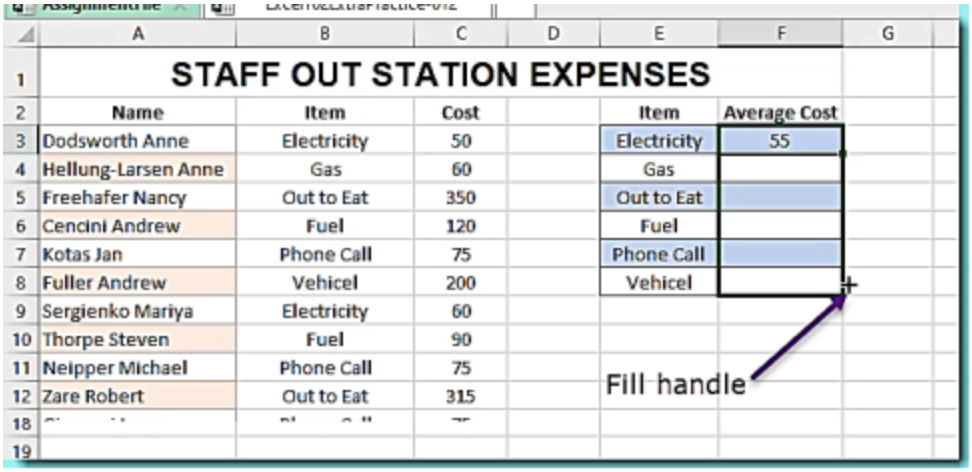
using the Fill method will make it easier to drag and fill the formula into several ranges of cells.

Next, the formula in cell **F3** is copied and pasted into cells **E4:F8**.



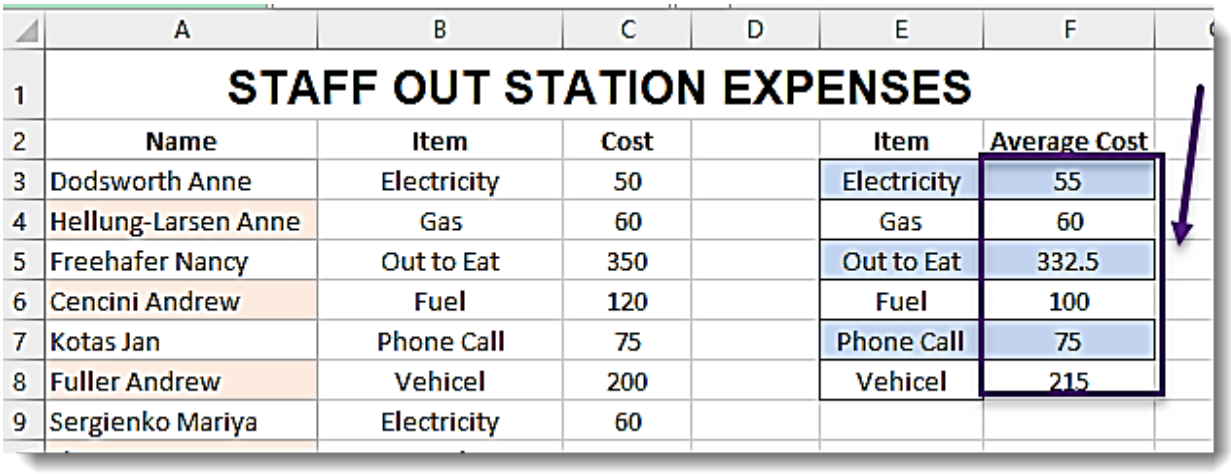
	A	B	C	D	E	F	G
1	STAFF OUT STATION EXPENSES						
2	Name	Item	Cost		Item	Average Cost	
3	Dodsworth Anne	Electricity	50		Electricity	55	
4	Hellung-Larsen Anne	Gas	60		Gas		
5	Freehafer Nancy	Out to Eat	350		Out to Eat		
6	Cencini Andrew	Fuel	120		Fuel		
7	Kotas Jan	Phone Call	75		Phone Call		
8	Fuller Andrew	Vehicel	200		Vehicel		
9	Sergienko Mariya	Electricity	60				

Alternatively, you can use the fill method by dragging the fill handle from cell **F3** to **F8**.



	A	B	C	D	E	F	G
1	STAFF OUT STATION EXPENSES						
2	Name	Item	Cost		Item	Average Cost	
3	Dodsworth Anne	Electricity	50		Electricity	55	
4	Hellung-Larsen Anne	Gas	60		Gas		
5	Freehafer Nancy	Out to Eat	350		Out to Eat		
6	Cencini Andrew	Fuel	120		Fuel		
7	Kotas Jan	Phone Call	75		Phone Call		
8	Fuller Andrew	Vehicel	200		Vehicel		
9	Sergienko Mariya	Electricity	60				
10	Thorpe Steven	Fuel	90				
11	Neipper Michael	Phone Call	75				
12	Zare Robert	Out to Eat	315				
18							
19							

The Final result is the **AVERAGE Cost** computed for each Criterion.



	A	B	C	D	E	F
1	STAFF OUT STATION EXPENSES					
2	Name	Item	Cost		Item	Average Cost
3	Dodsworth Anne	Electricity	50		Electricity	55
4	Hellung-Larsen Anne	Gas	60		Gas	60
5	Freehafer Nancy	Out to Eat	350		Out to Eat	332.5
6	Cencini Andrew	Fuel	120		Fuel	100
7	Kotas Jan	Phone Call	75		Phone Call	75
8	Fuller Andrew	Vehicel	200		Vehicel	215
9	Sergienko Mariya	Electricity	60			

COUNT FUNCTION

The **COUNT** function in Excel is a valuable tool that allows you to count cells with numbers or specific text values within a range.

COUNT has the following syntax:

Count(value1, [value2],....)

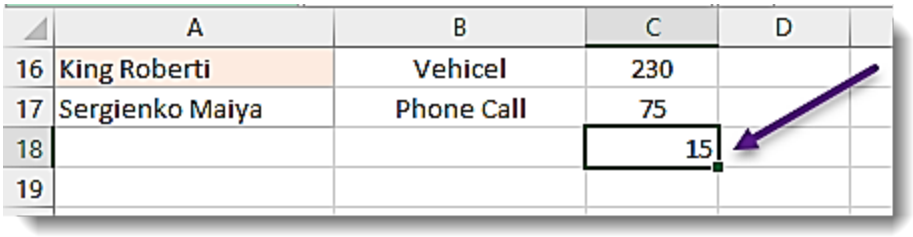
For example, to use the **COUNT Function**, you will first need to select the cell (**C18**) in which you intend to display the result.

	A	B	C	D	E	F	G
1	STAFF OUT STATION EXPENSES						
2	Name	Item	Cost		Item	Average Cost	
3	Dodsworth Anne	Electricity	50		Electricity	55	
4	Hellung-Larsen Anne	Gas	60		Gas	60	
5	Freehafer Nancy	Out to Eat	350		Out to Eat	332.5	
6	Cencini Andrew	Fuel	120		Fuel	100	
7	Kotas Jan	Phone Call	75		Phone Call	75	
8	Fuller Andrew	Vehicel	200		Vehicel	215	
9	Sergienko Mariya	Electricity	60				
10	Thorpe Steven	Fuel	90				
11	Neipper Michael	Phone Call	75				
12	Zare Robert	Out to Eat	315				
13	Giussani Laura	Phone Call	75				
14	Hellung-Larsen Anne	Fuel	90				
15	Davolio Nany	Electricity	55				
16	King Roberti	Vehicel	230				
17	Sergienko Maiya	Phone Call	75				
18							

Then, you can type the formula;

=COUNT(C3:C17)

This will count the number of cells within the range **C3:C17** with numeric



	A	B	C	D
16	King Roberti	Vehicel	230	
17	Sergienko Maiya	Phone Call	75	
18			15	
19				

The result shows there are 15 cells with numerals.

MAX OR MIN FUNCTION

The MAX or MIN functions in Excel allow you to find the largest or smallest values in a range of cells or a list of arguments.

MAX has the following syntax: **MIN** has the following syntax:

MAX(number1, [number2],....) **MIN(number1, [number2],....)**

For a range of cells **A1** to **A3**, to find the **Highest** value, you used the formula;

=MAX(A1, A2, A3)

A1 represents **number 1**, **A2** represents **number 2,** and **A3** represents **number 3.**

However, a preferable way to use the formula is to use the colon sign. So we have the formula written as

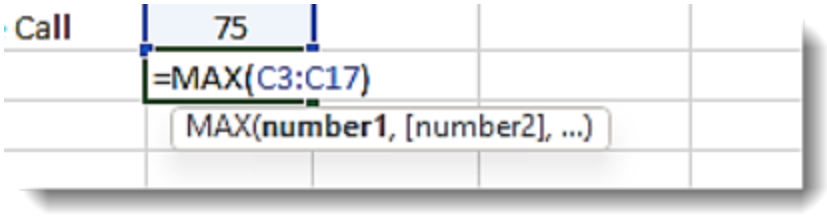
=MAX(A1:A3)

For a range of cells **A1** to **A3**, to find the **Lowest** value, you used the formula;

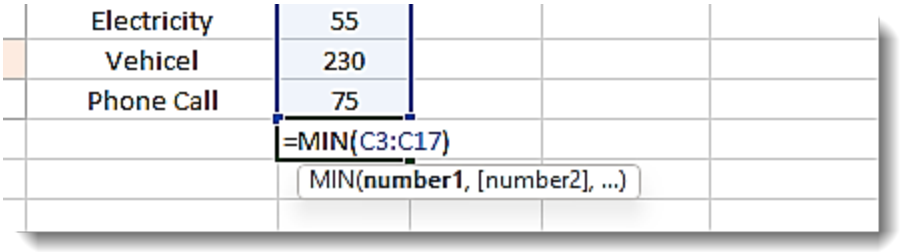
=MIN(A1: A3)

To use these functions, you must first select the cell where you want the result to be displayed and then enter the function along with the range or list of arguments.

The MAX function finds the highest value in a range of cells.



The MAX function finds the highest value in a range of cells.

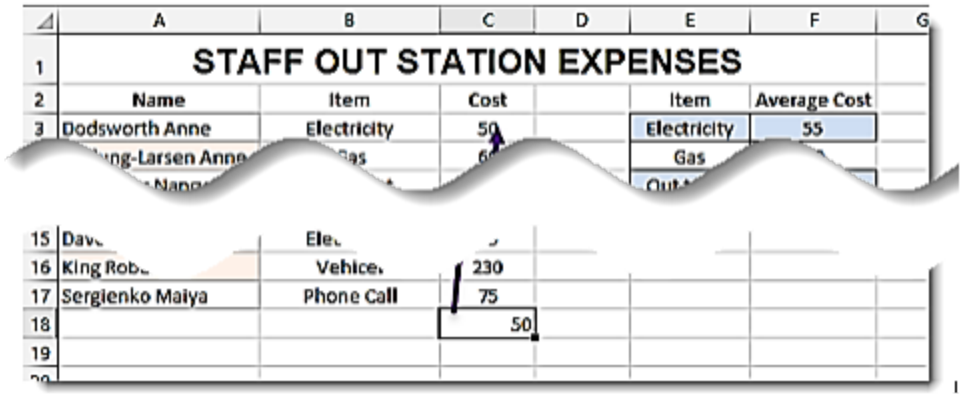


With these functions, you can find the highest or lowest values in a dataset and use Excel to analyze and understand the data.

The **Highest** value in the range of cells **C3:C17** is **50**.

	A	B	C	D	E	F	G
1	STAFF OUT STATION EXPENSES						
2	Name	Item	Cost		Item	Average Cost	
3	Dodsworth Anne	Electricity	50		Electricity	55	
4	Hellung-Larsen Anne	Gas	60		Gas	60	
5	Freehafer Nancy	Out to Eat	350		Out to Eat	332.5	
6	Cencini Andrew	Fuel	120		Fuel	100	
7	Kotas Jan	Phone Call	75		Phone Call	75	
8	Fuller Andrew	Vehicel	200		Vehicel	215	
9	Sergienko Mariya	Electricity	60				
10	Thorpe Steven	Fuel	90				
11	Neipper Michael	Phone Call	75				
12	Zare Robert	Out to Eat	315				
13	Giussani Laura	Phone Call	75				
14	Hellung-Larsen Anne	Fuel	90				
15	Davolio Nany	Electricity	55				
16	King Roberti	Vehicel	230				
17	Sergienko Maiya	Phone Call	75				
18			350				
19							

The **Lowest** value in the range of cells **C3:C17** is **50**.



MEDIAN FUNCTION

The MEDIAN Function is used to find the central value in a range of cells or a list of arguments in Excel.

MEDIAN has the following syntax:

MEDIAN(number1, [number2],....)

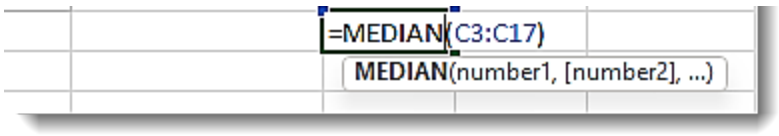
For a range of cells **A1** to **A3**, to find the **central** value, you used the formula;

=MEDIAN(A1: A3)

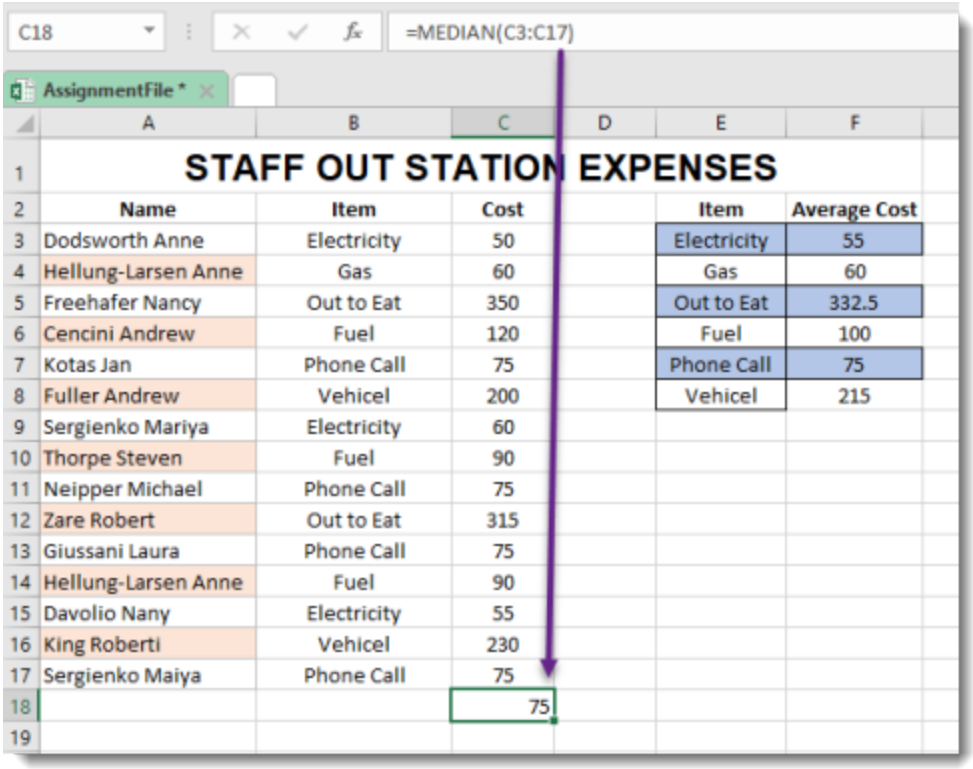
It helps find trends or patterns in a dataset and is less impacted by outliers or extreme values compared to the Average value. To use MEDIAN, you must first select the cell where you want the result to be displayed.

For example, to determine the median in the range of cells **C3** to **C17**, the following formula is entered into cell **C18;**

=**MEDIAN(C3:C17)**



The final results show a Midian cost of **75.**


C18
=MEDIAN(C3:C17)
AssignmentFile *
STAFF OUT STATION EXPENSES
Name
Item
Cost
Item
Average Cost
Dodsworth Anne
Electricity
50
Electricity
55
Hellung-Larsen Anne
Gas
60
Gas
60
Freehafer Nancy
Out to Eat
350
Out to Eat
332.5
Cencini Andrew
Fuel
120
Fuel
100
Kotas Jan
Phone Call
75
Phone Call
75
Fuller Andrew
Vehicel
200
Vehicel
215
Sergienko Mariya
Electricity
60
Thorpe Steven
Fuel
90
Neipper Michael
Phone Call
75
Zare Robert
Out to Eat
315
Giussani Laura
Phone Call
75
Hellung-Larsen Anne
Fuel
90
Davolio Nany
Electricity
55
King Roberti
Vehicel
230
Sergienko Maiya
Phone Call
75
75

MODE FUNCTION

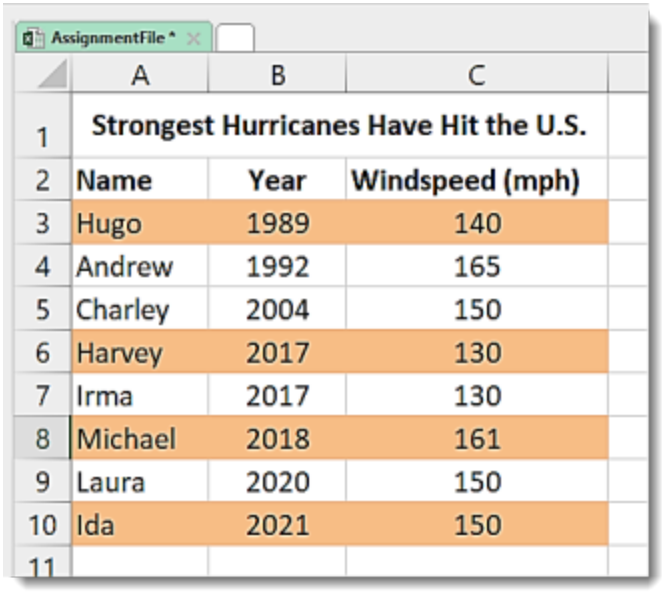
Excel's MODE function is a statistical function used to identify the value that occurs most frequently in a given cell range.

The **MODE** function syntax:

=MODE(number1, [number2], ...)

The MODE function can manipulate cells containing numbers by specifying up to **255 arguments**. These arguments can include numbers or cell references to cells containing numbers.

An example of how to use the MODE function is shown in the example below:

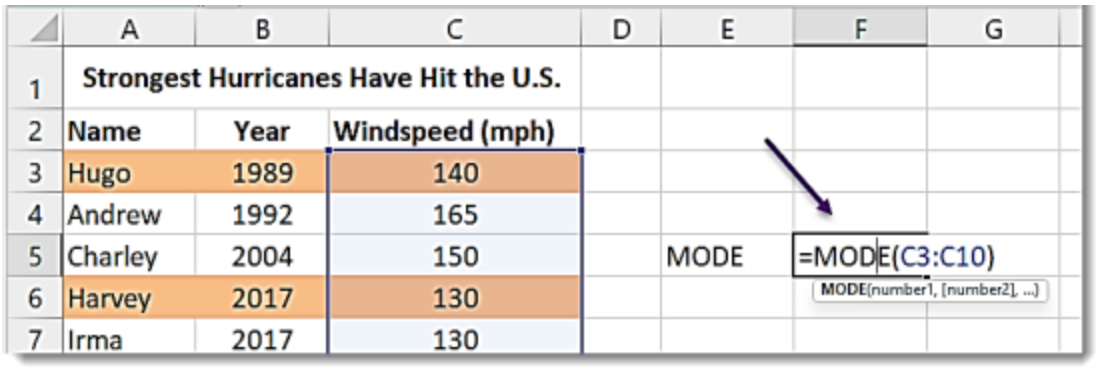


	A	B	C
1	Strongest Hurricanes Have Hit the U.S.		
2	Name	Year	Windspeed (mph)
3	Hugo	1989	140
4	Andrew	1992	165
5	Charley	2004	150
6	Harvey	2017	130
7	Irma	2017	130
8	Michael	2018	161
9	Laura	2020	150
10	Ida	2021	150
11			

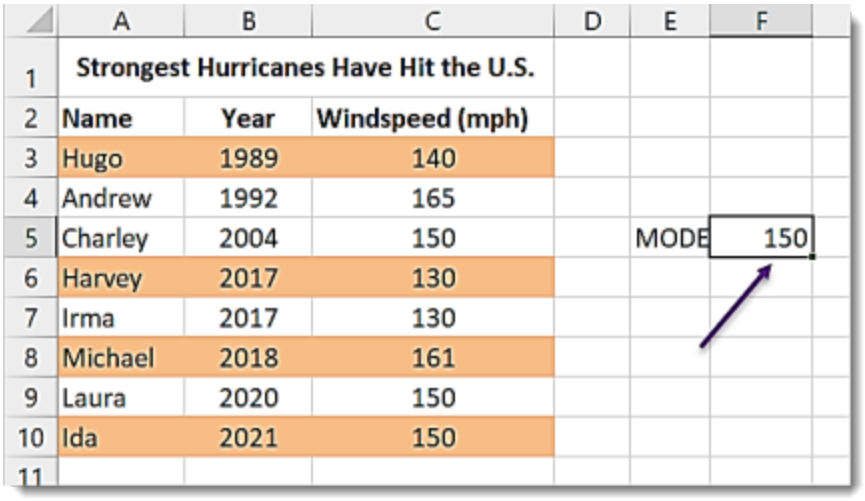
If you have a set of **Values** in a range of cells **C3** to **C10** (**Windspeed**), you can use the MODE Function to find the frequency of a particular value using the formula;

=MODE(C3:C10)

The formula must be entered into the cell (**F5)** you want the result to appear



The final result will be **150**. This is the most occurring Windspeed from the data collected.



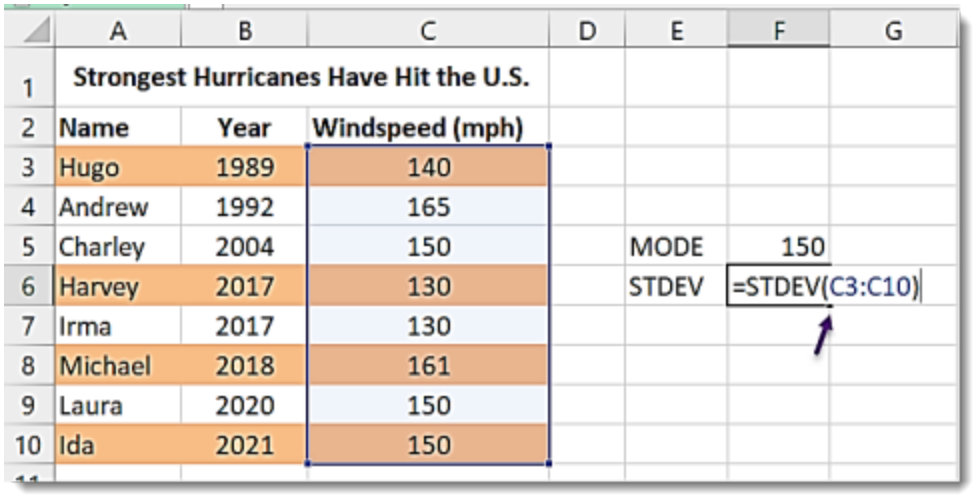
The MODE function can also take more than one cell range as an argument so that you can analyze more than one range simultaneously. But the MODE function will give an error if multiple numbers have the same frequency in the given range.

STANDARD DEVIATION FUNCTION

The variability of a data set can be measured by calculating its standard deviation. A low standard deviation means that the data points are gathered around the **mean**, whereas a high standard deviation shows that the data points are more extensively dispersed.

For example, to calculate the standard deviation of a set of values in cells **C3** through **C10**, you would use the following formula:

=STDEV(C3:C10)



	A	B	C	D	E	F	G
1	Strongest Hurricanes Have Hit the U.S.						
2	Name	Year	Windspeed (mph)				
3	Hugo	1989	140				
4	Andrew	1992	165				
5	Charley	2004	150		MODE	150	
6	Harvey	2017	130		STDEV	=STDEV(C3:C10)	
7	Irma	2017	130				
8	Michael	2018	161				
9	Laura	2020	150				
10	Ida	2021	150				



STDEV	12.95

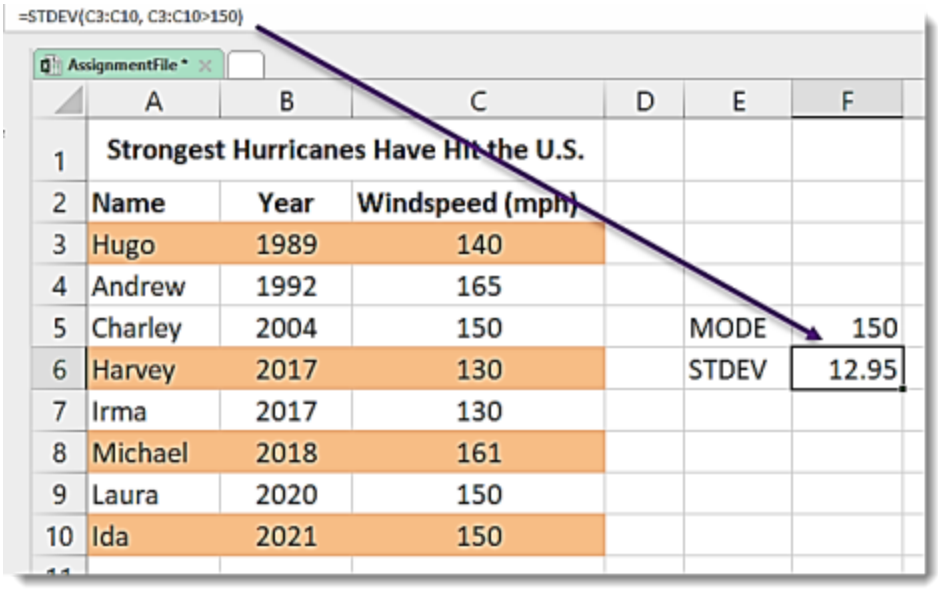
STDEV Result

You can also use the STDEV function to calculate the standard deviation across a range of cells that you have selected that satisfy a particular set of criteria.

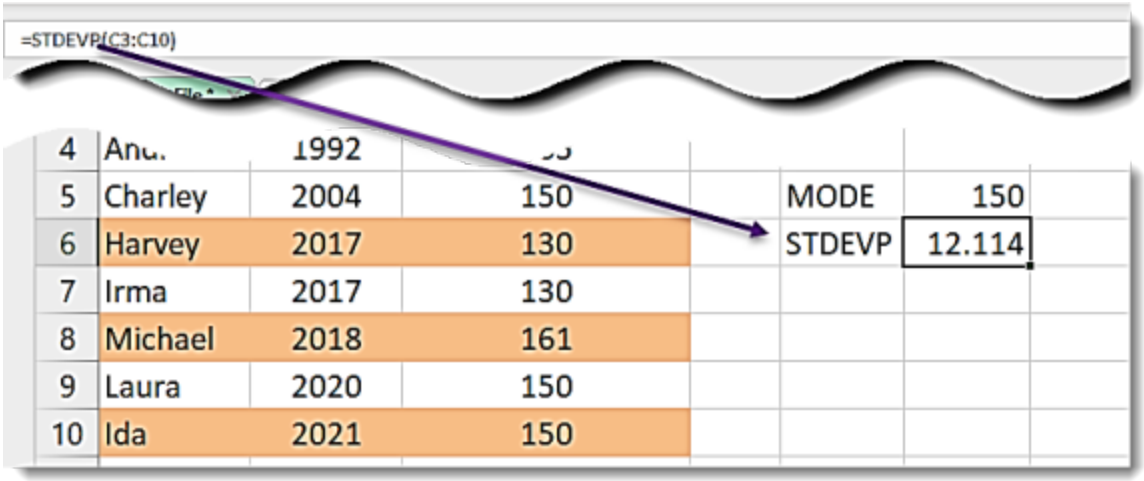
For example, if you want to calculate the standard deviation of the values in cells C3 through C10 that are greater than 150, you can use the formula provided below:

=STDEV(C3:C10, C3:C10>150)

	STDEV	=STDEV(C3:C10, C3:C10>150)



Aside from the STDEV function, Excel also has a function called **STDEVP** that calculates the standard deviation of a population.



Also, the function called **STDEVPA**, allows you to calculate a population's standard deviation based on an entire population (instead of just a sample).

VARIANCE FUNCTION

Excel's built-in VARIANCE function can be used to determine the variance of a data set. Thus, variance quantifies the extent to which a given value or set of values deviates from the mean.

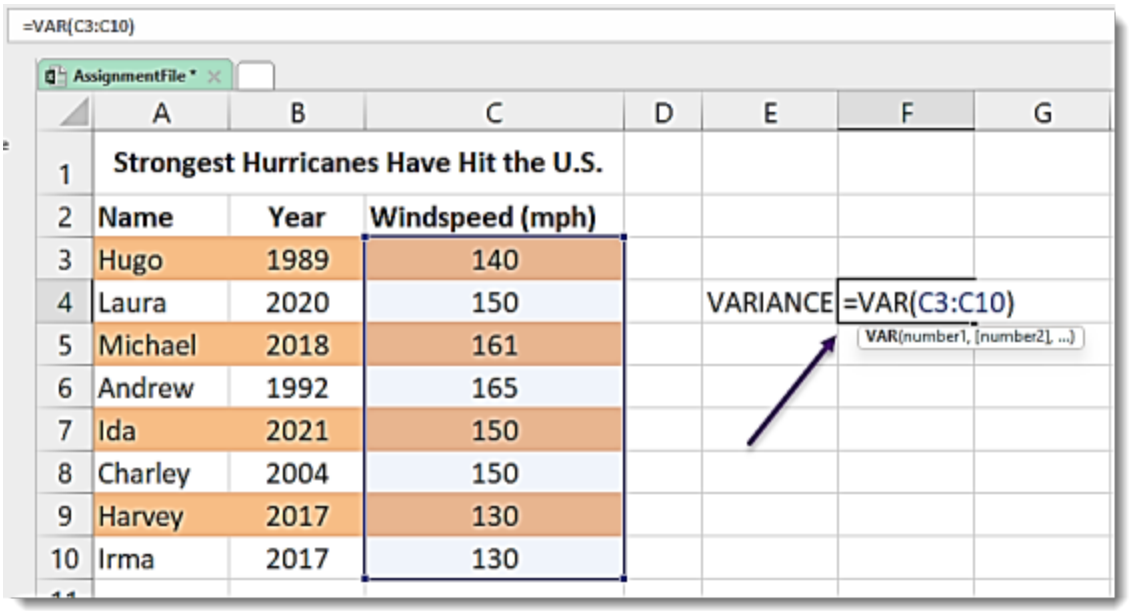
The VARIANCE function requires selecting a range of cells containing the values for calculating the variance.

The **VARIANCE** function syntax is as follows:

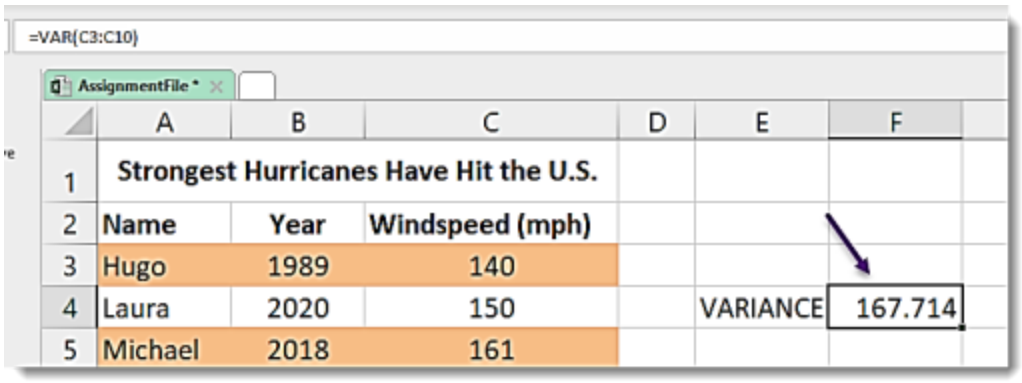
=VAR(range)

For example, if you have a set of values in cells **C3** to **C10**, you would enter the following formula in a cell (**F4**) you the result of the variance to appear:

=VAR(C3:C10)



The VARIANCE function returns a decimal number representing the set's variance; **167.714**



The VARIANCE function is useful for various statistical analyses, including identifying trends or patterns in data sets, comparing data sets, and predicting future outcomes based on previous data collected.

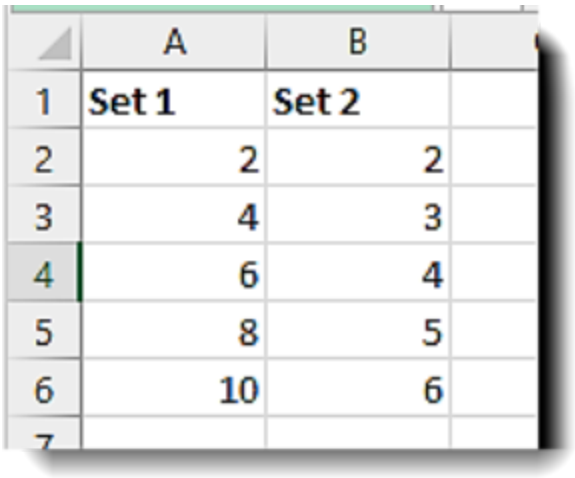
CORRELATION FUNCTION

The correlation coefficient shows how strong and indicates the direction in which two variables are related. It is a tool in Excel used to determine the connection between two variables, such as the relationship between your weight and height. It is often used to determine how one variable will act based on another.

The **CORRELATION** function syntax:

= **CORREL** (number1, [number2], ...)

You need to provide two parameters to use the CORRELATION function. The first set of data is **number1**, and the second is **number2**. You can specify data in a range of cells, like **C1:C10** and **D1:D10**, or as a list of values, like (2,4,6,8,10) and {2,3,4,5,6}.



	A	B
1	Set 1	Set 2
2	2	2
3	4	3
4	6	4
5	8	5
6	10	6

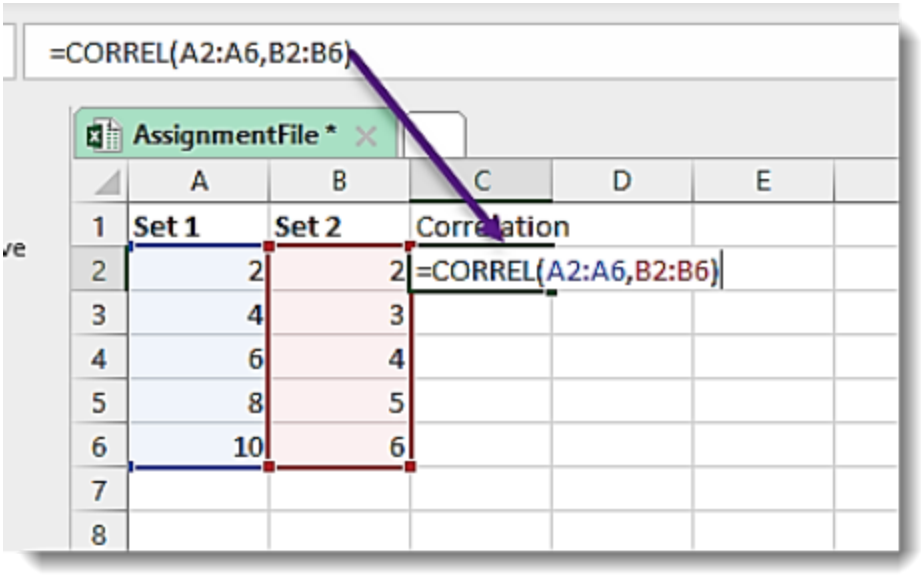
For example, in an excel worksheet, columns A and B have the following values:

Column A: 2, 4, 6, 8, 10

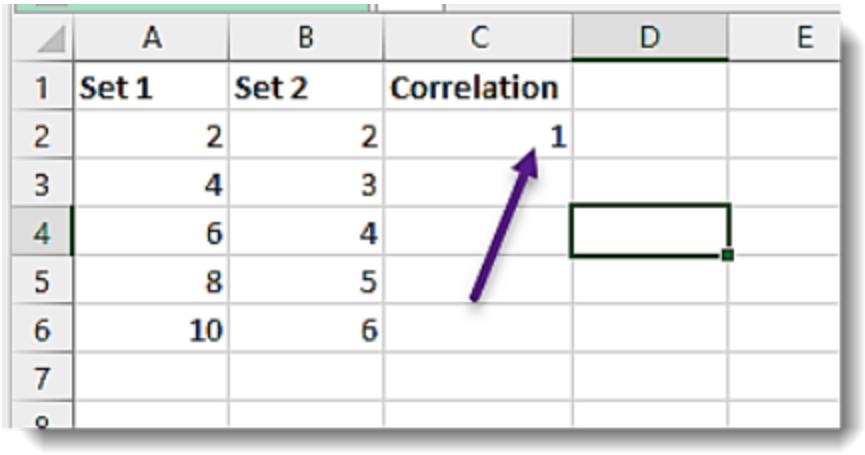
Column B: 2, 3, 4, 5, 6

Using the CORRELATION function to be inserted in cell **C2**, calculate the correlation coefficient between the cell ranges **A2** to **A6** and **B2** to **B6** using the following formula:

= **CORREL** (**A2**:**A6**, **B2**:**B6**)



The result appears in decimals.



	A	B	C	D	E
1	**Set 1**	**Set 2**	**Correlation**		
2	2	2	**1**		
3	4	3			
4	6	4			
5	8	5			
6	10	6			
7					

The Correlation Function returns the value **1** as the correlation coefficient between the two data sets. A value 1, or the closer it is to **1**, indicates a perfect positive linear correlation between two variables, meaning as one variable increases, so does the other.

LOGICAL FUNCTIONS

IF FUNCTION

Excel's IF function is one of its most commonly used logical functions. This function allows you to test a logical condition. This test returns one value if the test is true, and another value if it is false.

The **IF** function syntax:

IF(logical_test, value_if_true, value_if_false)

Logical-test is the first argument **required** to state the condition to be evaluated and will either return a result of TRUE or FALSE.

Value_if_true is an optional argument used to indicate the value to be returned if the evaluation of the logical_test is TRUE.

Value_if_false is an optional argument used to indicate the value to be returned if the evaluation of the logical_test is FALSE.

Any of the following logical operators can be added to your arguments when using the IF function in Excel:

- = (equal to)
- < (less than)
- > (greater than)
- >= (greater than or equal to)

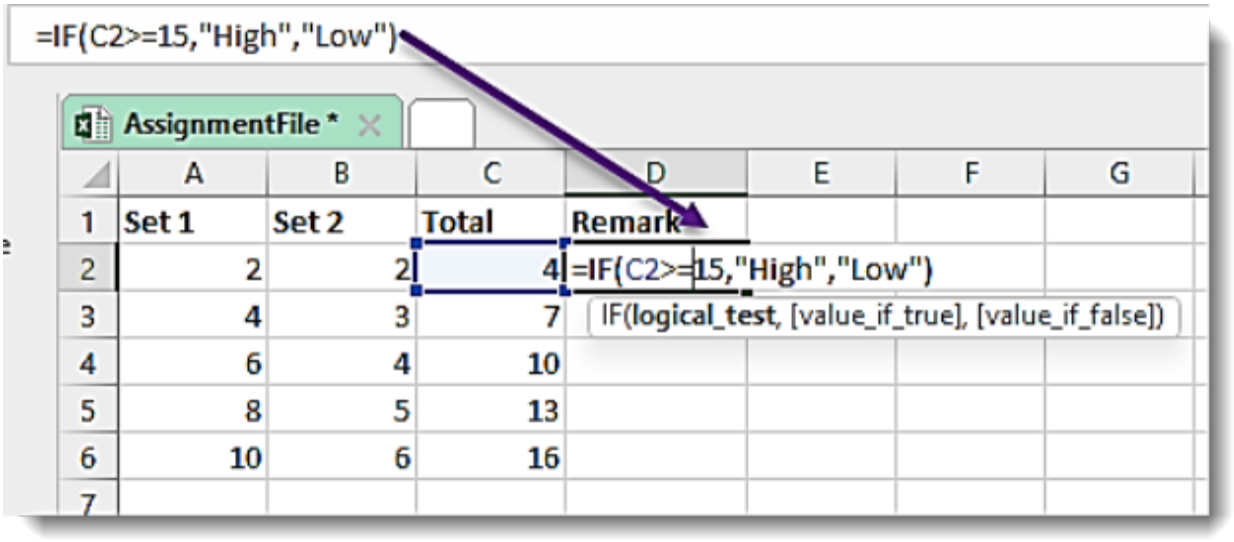
♦ <= (less than or equal to)

♦ <>(not equal to)

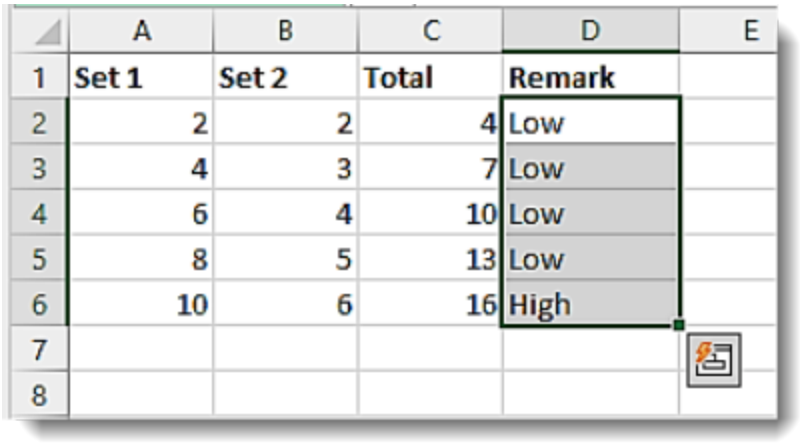
For example, the **IF** function can test if the content of a cell is a value greater than and equal to **15**, and then return "**High**" if the test is **True**, and "**Low**" if the test is **False**.

The formula to use in cell **D2**:

=IF(**C2>=15**,"**High**","**Low**")



Below is the final result after Filling and dragging the formula to cell **D6**.

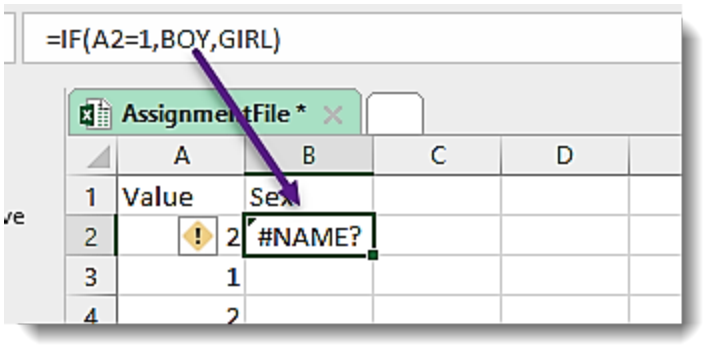


	A	B	C	D	E
1	Set 1	Set 2	Total	Remark	
2	2	2	4	Low	
3	4	3	7	Low	
4	6	4	10	Low	
5	8	5	13	Low	
6	10	6	16	High	
7					
8					

Formulas containing text **references** require **quotation** marks, even if only a space is used. You will see the **#NAME**? error if you do not use double

quotation marks **""** for a text value.

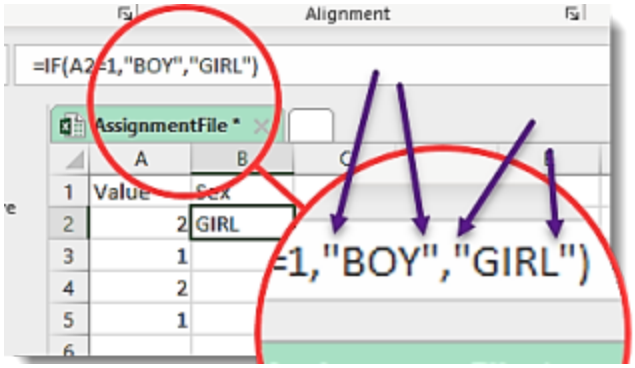
For example, If the condition to return the Text value **BOY** requires a cell to contain the value **1**, or **GIRL** if the cell has the value **2**. If not placed inside double quotation marks, Excel won't recognize the text value.



The **#NAME?** error appears when Excel cannot recognize the text you entered in a formula or function, when you enter a range name incorrectly, reference a deleted range name, or fail to quote your text.

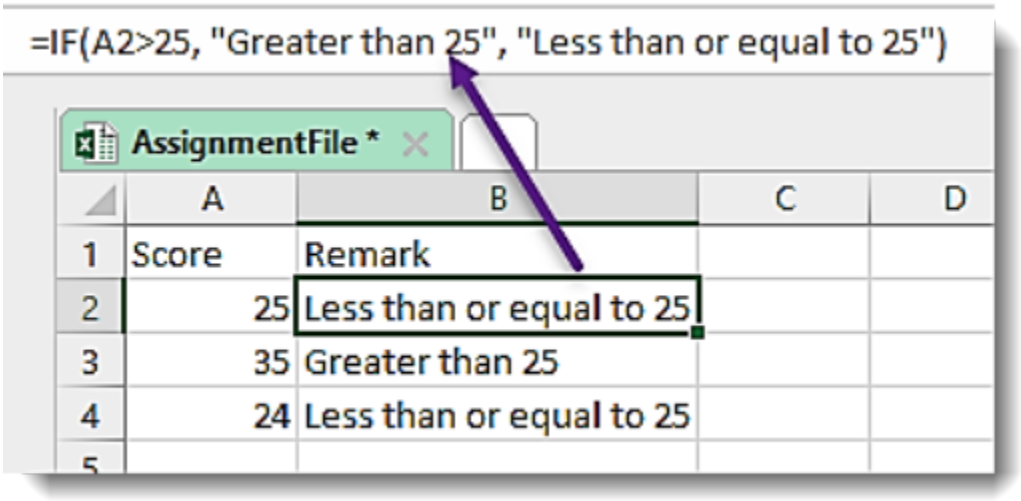
BOY should be "BOY**"**

GIRL should be **"**GIRL**"**

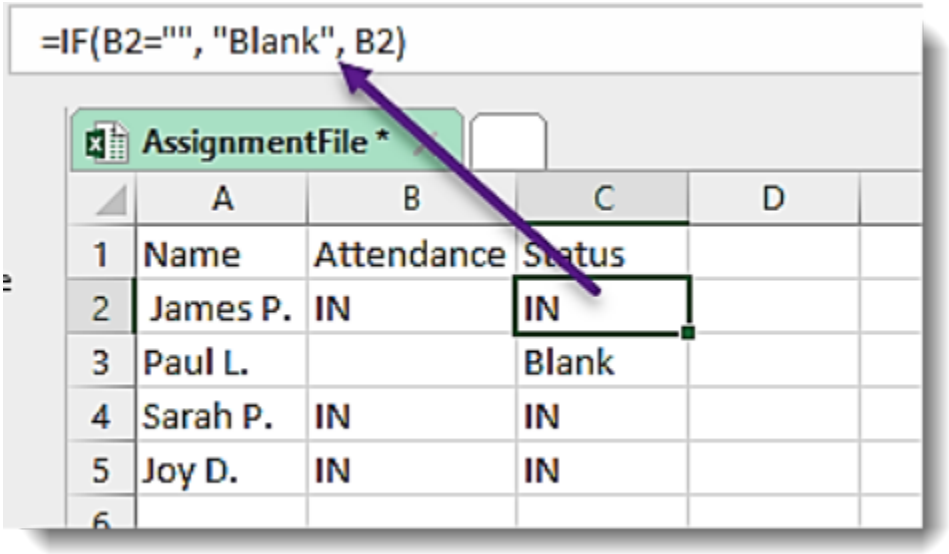


More IF Function examples using double quotation marks

- Check IF a value in cell **A2** is greater than 25: =IF(**A2**>25, "Greater than 25", "Less than or equal to 25")



- Check IF cells are blank: =IF(**B2**="", "Blank", **B2**)

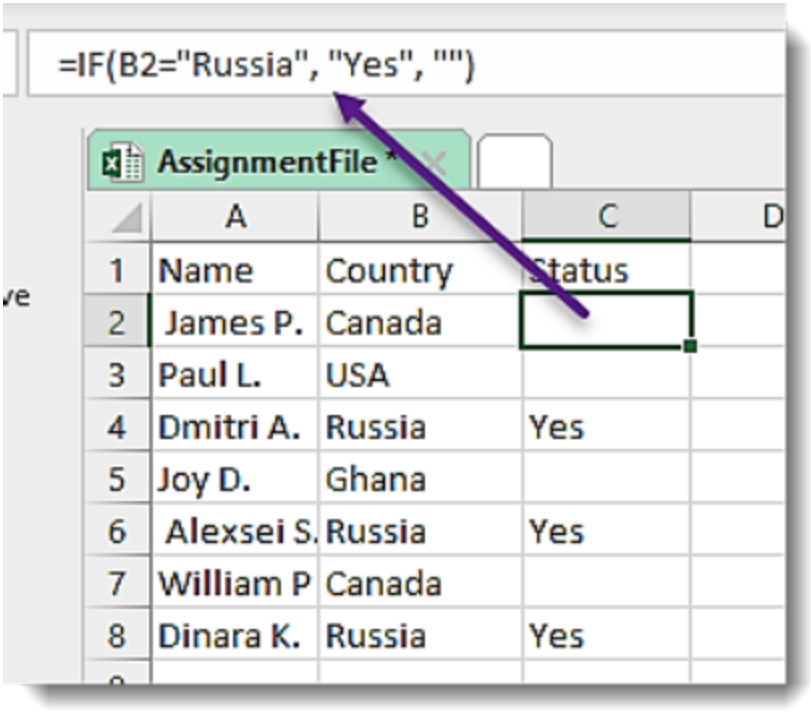


The formula is used to check is a cell is blank, or else it returns the cell content.

When cell **B2** is checked, and it is blank, the Result is Blank, else return the value in cell **B2**

The above illustration can be used to locate cells in a worksheet that were omitted when entering data.

- Check IF a particular value is in a Cell: =IF(B2="Russia", "Yes", "")



Use this method to look for a particular value in a worksheet with a lot of data. The IF function lets you quickly find cells within a column containing specific information rather than manually scrolling through the entire column.

AND FUNCTION

The AND function enables simultaneous evaluation of multiple conditions and returns a **TRUE** result **IF** all the requirements are fulfilled; otherwise, any conditions not met will lead to a FALSE return.

Here's a quick rundown of how the AND function works:

The **AND** function syntax of

AND (logical1, [logical2], ...)

logical1, and logical2, are the conditions you enter in the formula to test.

For Example,

=AND(B3>=5, C2=>10)

	A	B	C	D
1	ADMISSION SHEET			
2	Name	Age	Score	Remark
3	James P.	5	10	
4	Paul L.	4	15	
5	Dmitri A.	5	10	
6	Joy D.	6	9	
7	Alexsei S.	5	9	
8	William P	4	13	
9	Dinara K.	6	15	

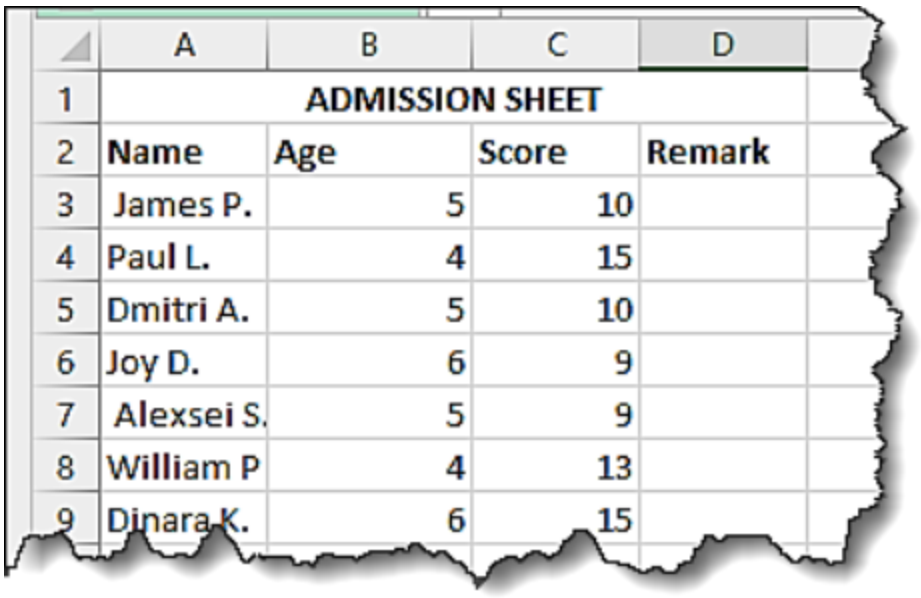
This formula returns **TRUE** if the value in cell **B3** is greater than and equal to **5** and the value in cell **C3** is greater than and equal to **10**.

Using the AND function, you can only test a maximum of 255 multiple conditions to return either a TRUE or FALSE result.

When **testing more than one condition**, the **AND** function returns a TRUE result IF all conditions given are met; otherwise, it will return FALSE.

You can also create more complex formulas by adding the **AND** function in conjunction with other functions, such as the IF function. When creating a complex formula, do well using a parenthesis to separate each section of the functions.

For example, an **Admission Sheet** has a condition that the age of the applicant must be equal to or above 5 years, **AND** the person must score above or equal to 10.



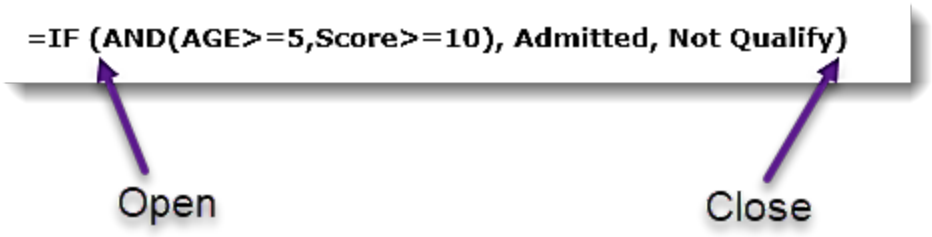
	A	B	C	D
1	ADMISSION SHEET			
2	Name	Age	Score	Remark
3	James P.	5	10	
4	Paul L.	4	15	
5	Dmitri A.	5	10	
6	Joy D.	6	9	
7	Alexsei S.	5	9	
8	William P	4	13	
9	Dinara K.	6	15	

The complex formula will include a **IF AND** Function interpreted in the format below;

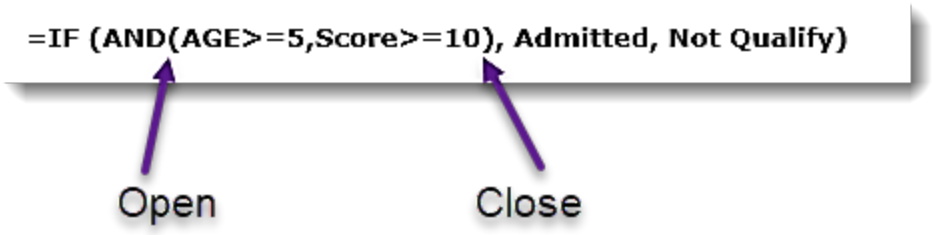
=IF (AND(AGE>=5,Score>=10), Admitted, Not Qualify)

For every opened parenthesis, you must have a closed one

The parenthesis opened after the **IF** is closed by the last parenthesis.



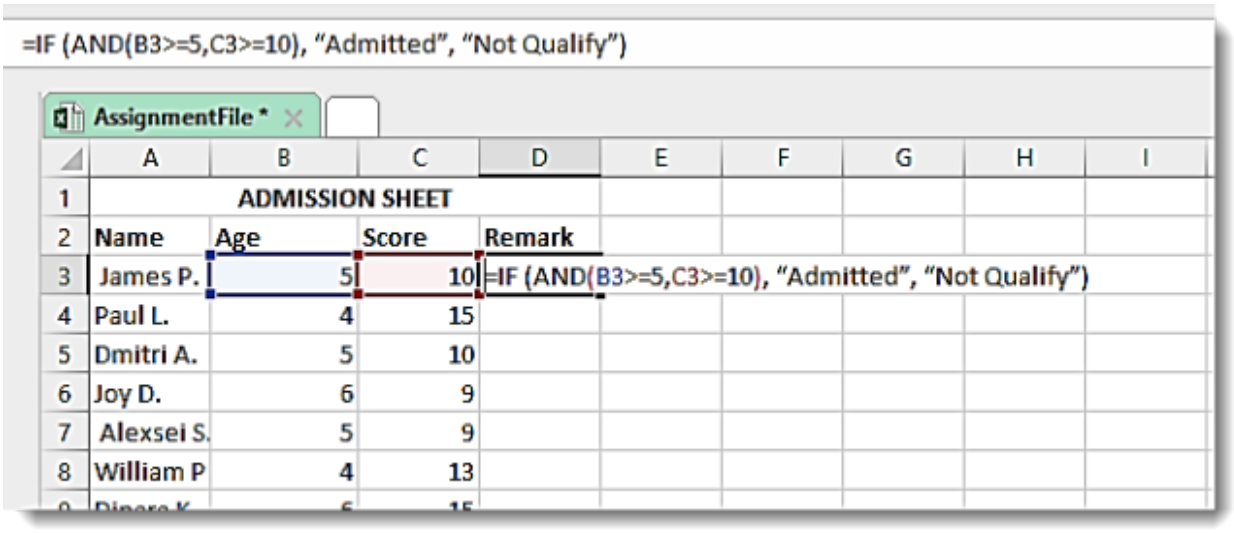
Likewise, the parenthesis opened after the **AND** function is closed after the last condition.



If you count the number of opened parethesis, is equal to the number of closed parentheses. If this is not properly done, Excel will pop out an error message and possibly make suggestions for you to accept. Any suggestion made by Excel should be checked before confirming, or the result might be wrong.

Finally, the Excel formula will have to be entered in cell **D3** in the format below;

=IF(AND(B3>=5,C3>=10),"Admitted","Not Qualify")



Take note of the open and closed quotation marks used on the Text **Admitted**, **Not Qualify**. If not added, the formula will return a **#NAME?** error.

	A	B	C	D
1	ADMISSION SHEET			
2	Name	Age	Score	Remark
3	James P.	5	10	Admitted
4	Paul L.	4	15	Not Qualify
5	Dmitri A.	5	10	Admitted
6	Joy D.	6	9	Not Qualify
7	Alexsei S.	5	9	Not Qualify
8	William P	4	13	Not Qualify
9	Dinara K	6	15	Admitted

OR FUNCTION

The OR function in Excel is a logical function that allows you to evaluate one or more conditions and determine if any of them are TRUE. It returns a TRUE value if any of the conditions given are true and a FALSE value if all conditions are false

The OR function allows you to create multiple conditions and evaluate them one after the other. If any of the conditions are true, the OR function will return a TRUE value.

The OR function syntax is as follows:

OR(condition1, condition2, ...)

For example, in the formula

=OR(B3>30 years old, C3= “US”)

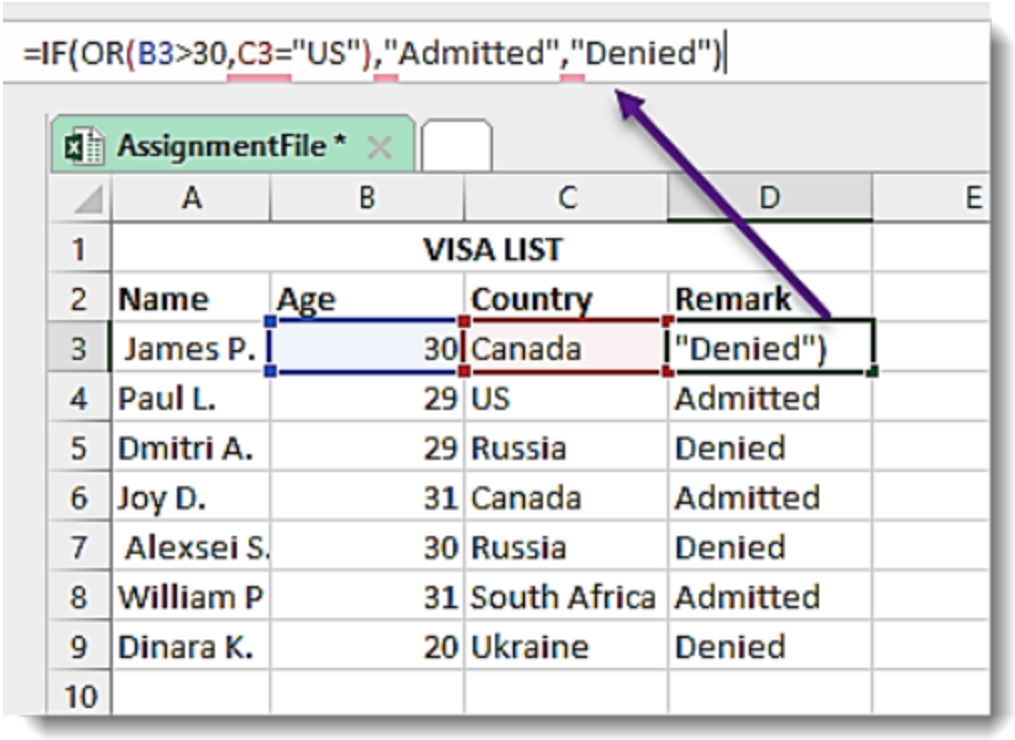
The **OR** function in the above formula checks if the content in cell **B3** has the value **30** or if the content in cell **C3** has the text entered as **US**. The result of the function will be TRUE if either one of the conditions is met; otherwise, it will return FALSE.

You can also create more complex formulas by adding the **OR** function in conjunction with other functions, such as the **IF** function.

For example, a **VISA LIST** has a condition that applicants must be **US** citizen **OR** is above **30** to be **Admitted** into the country if TRUE, else **Denied** if FALSE.

The formula used is;

=IF(OR(B4>30,C4="US"),"Admitted","Denied")



In the above example, the **OR** function checked if the value in cell **B3** is greater than 30 or the Text in cell **C3** is **US**.



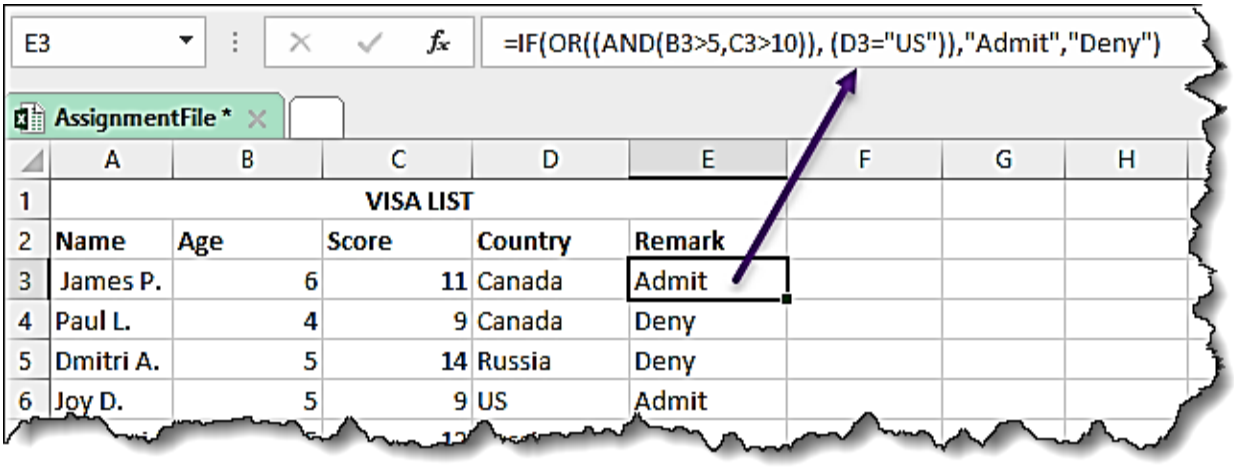
If either condition is true, the formula will return **Admitted**, otherwise it will return **Denied** if false.

Advanced formulas also involve combining the **OR** function with other Excel functions, such as **IF**, **AND**, and using parentheses to separate the different sections of the functions. This type of formula is called **Nested** function in Excel.

For example, you have an **IF** function to check if a certain cell value is greater than 5 **AND** another Cell value is Greater than **10**, **OR** another cell value equal to the text **US**. These means the conditions will be looking at three cells to come up with a result.

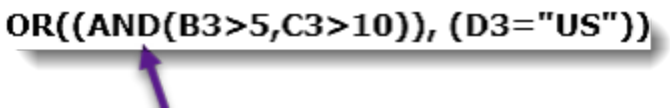
This can be written as:

=IF(OR((AND(B3>5,C3>10)), (D3="US")),"Admit","Deny")

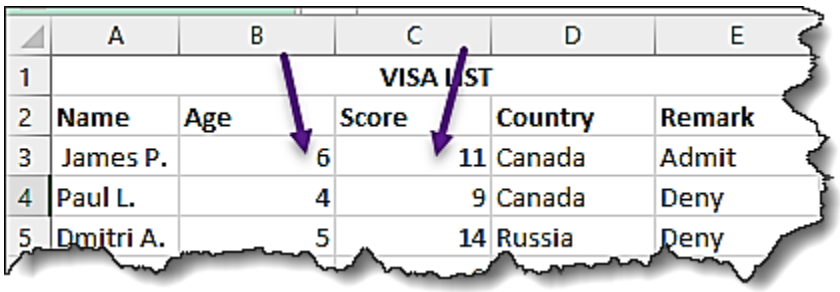


	A	B	C	D	E	F	G	H
1	VISA LIST							
2	Name	Age	Score	Country	Remark			
3	James P.	6	11	Canada	Admit			
4	Paul L.	4	9	Canada	Deny			
5	Dmitri A.	5	14	Russia	Deny			
6	Joy D.	5	9	US	Admit			

In above example, the **AND** function is nested inside the **OR** function, Which are all nested inside the **IF** function.

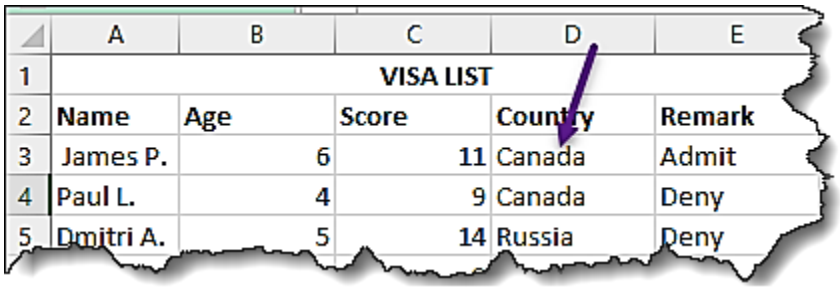


- The **AND** function checks if the value in cell **B3** is greater than 5 and if the value in cell **C3** is greater than **10**.



	A	B	C	D	E
1			VISA LIST		
2	**Name**	**Age**	**Score**	**Country**	**Remark**
3	James P.	6	11	Canada	Admit
4	Paul L.	4	9	Canada	Deny
5	Dmitri A.	5	14	Russia	Deny

- The **OR** function checks if the value in cell **D3** equals the text **US**.



	A	B	C	D	E
1			VISA LIST		
2	**Name**	**Age**	**Score**	**Country**	**Remark**
3	James P.	6	11	Canada	Admit
4	Paul L.	4	9	Canada	Deny
5	Dmitri A.	5	14	Russia	Deny

- The **IF** function then returns "**Admit**" if either of the above conditions (AND, OR) you created is met and "**Deny**" if neither are met.

Remember, when using nested functions, the order of operations should be considered. The parenthesis plays a role in specifying the order of operations.

NOT FUNCTION

NOT Function is used when you want a formula to return an opposite result to a logical test. This means if the given logical test is FALSE, the formula returns TRUE; otherwise, it returns a FALSE result if the logical test is TRUE.

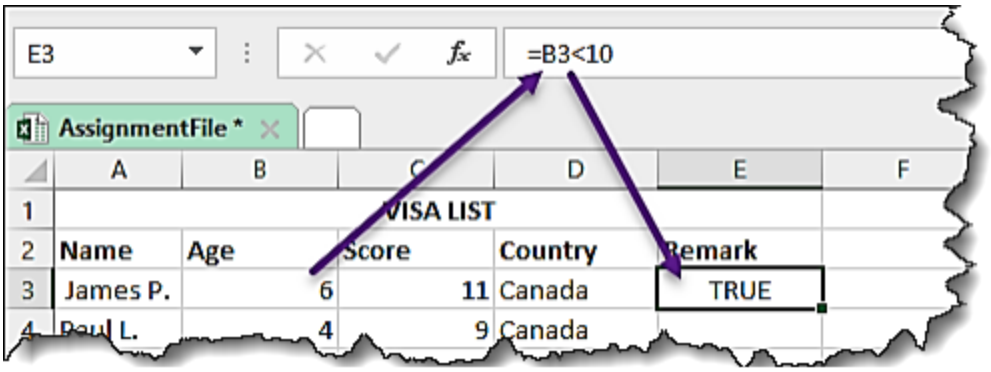
To create a more advanced formula, you can also nest the NOT function with other logical functions like IF, AND, and OR. This approach allows you to make more accurate decisions based on available data.

The **NOT** function syntax is as follows:

NOT(logical_test).

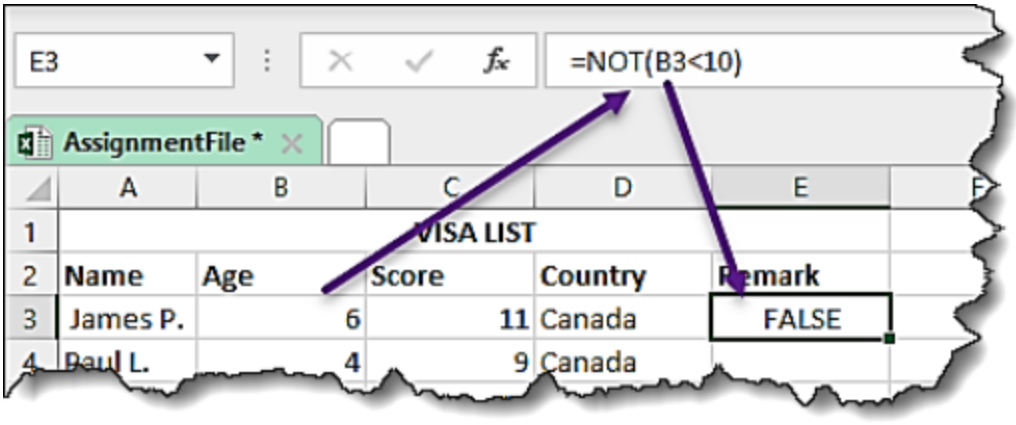
The logical_test can be any value or an expression considered as either TRUE or FALSE.

For example, if you want to check if a particular cell value is less than 10, the logical test would be **B3<10**.



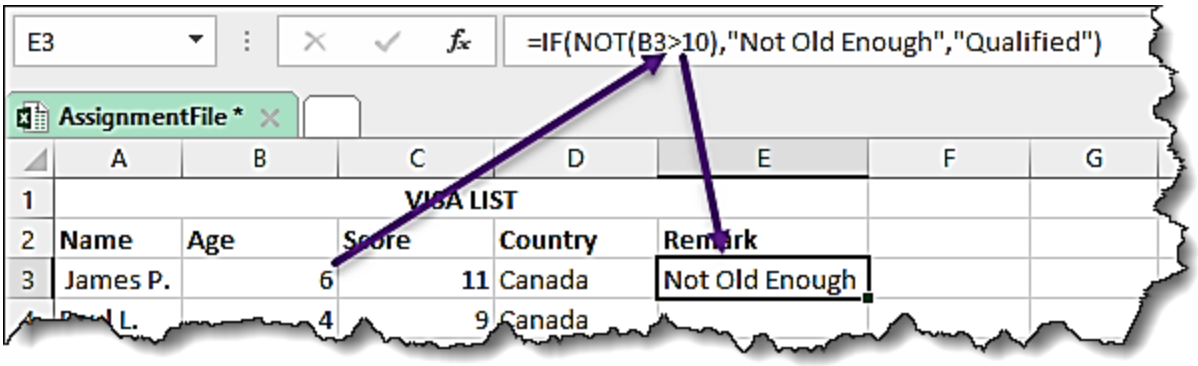
To check if the value is **NOT** less than 10, you would use the NOT function like this:

=NOT(B3<10)



In combination with other logical functions, you can check if a particular cell value is **NOT** greater than 10, by combining it with the **IF** function like this:

=IF(NOT(B3>10),"Not Old Enough","Qualified")



This formula will return "**Not Old Enough**" if the value in cell **B3** is **NOT** greater than **10**, and "**Qualified**" if the value in cell **B3** is greater than **10**.

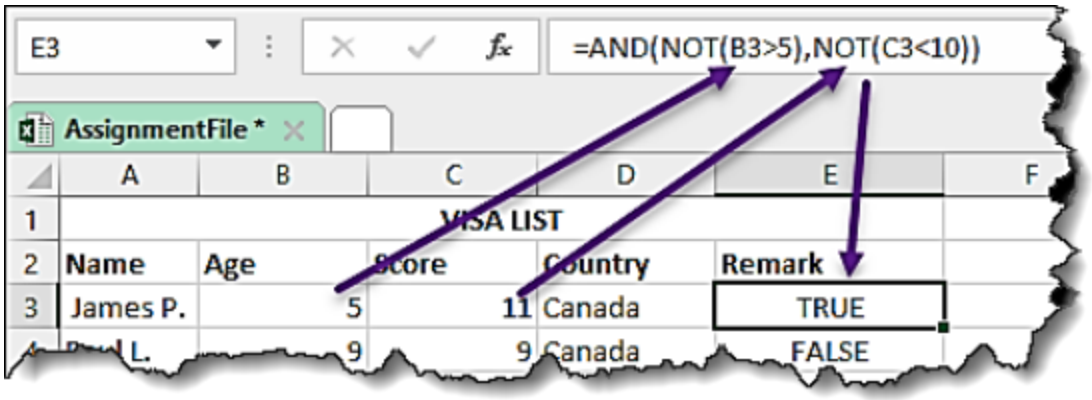
	A	B	C	D	E
1	VISA LIST				
2	Name	Age	Score	Country	Remark
3	James P.	8	11	Canada	Not Old Enough
4	Paul L.	9	9	Canada	Not Old Enough
5	Dmitri A.	11	14	Russia	Qualified
6	Joy D.	12	9	US	Qualified
7	Alexsei S.	9	12	Russia	Not Old Enough
8	William P	11	11	South Africa	Qualified
9	Dinara K.	13	14	Ukraine	Qualified

Notice that the **NOT** function also works with a Text value.

Here is another example of nesting the **NOT** function with other logical functions.

If you want to check if a particular cell value is **NOT** greater than 5 **AND** another cell value **NOT** less than 10, you can use the **NOT** function in combination with the **AND** function in this format:

=AND(NOT(B3>5),NOT(C3<10))



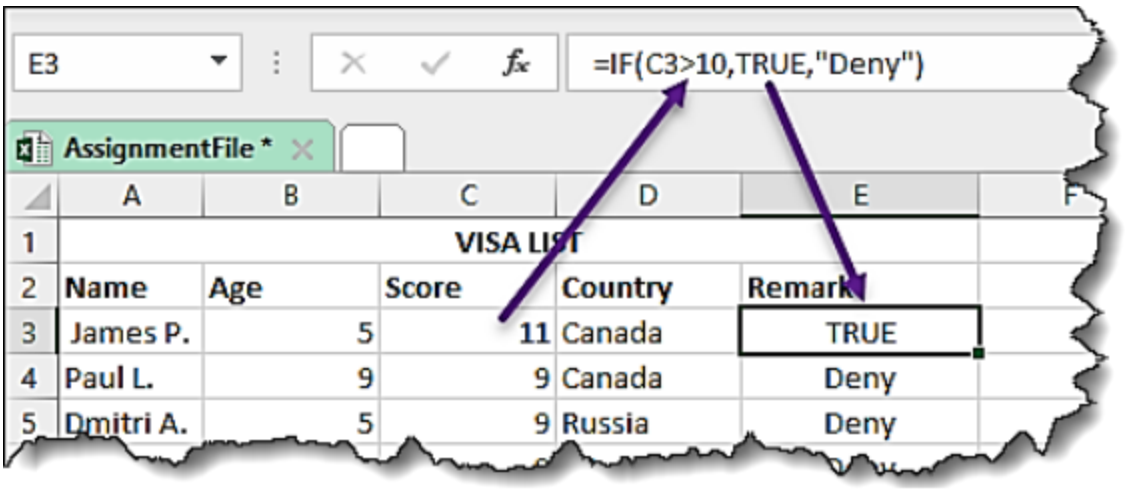
The formula in the above example will return TRUE if the value in cell **B3** is NOT greater than 5 AND the value in **C3 is** NOT less than 10, and FALSE if either condition is met.

TRUE FUNCTION

The TRUE function in Excel returns TRUE and is often combined with other logical functions to make more complex and accurate decisions. The TRUE function is commonly used with the IF function to hardcode TRUE value in decision-making.

For example, if you want to check if a certain cell value is greater than 10 and return the value of "**Admit**" if true, you can use the TRUE function in combination with the IF function like this:

=IF(C3>10,TRUE,"Deny")



This formula returns **TRUE** if the value in cell **C3** is greater than 10 and "Deny" if the value is not greater than 10.

Notice the word **TRUE** was not placed inside an open and closed quotation mark, yet Excel recognized it as a Function, and no error was detected.

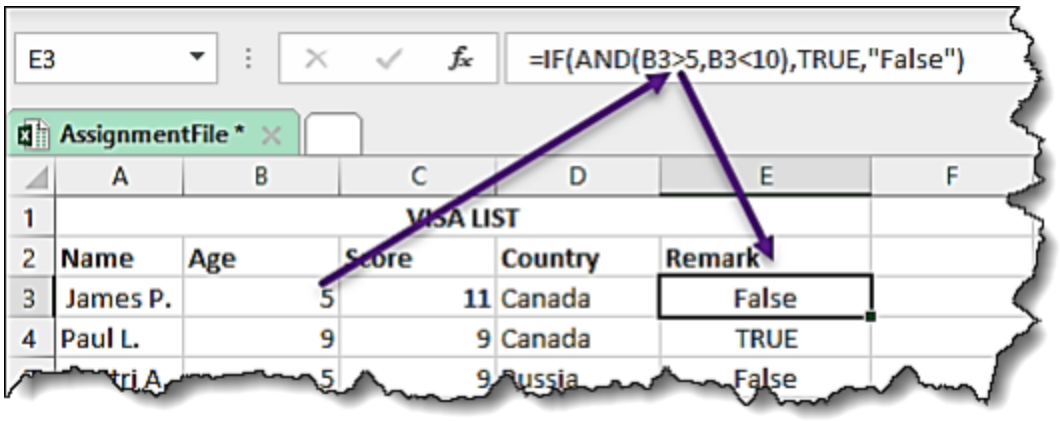
The TRUE function can also be used with the **AND** function to return True only if all conditions are met.

An example of using the AND function will be to check if a cell value is between greater than 5 and less than10, like this:

=AND(B3>5,B3<10)

If you wish to have the output as "TRUE" when the condition is met, you can use the TRUE function in combination with the AND function like this:

=IF(AND(B3>5,B3<10),TRUE,"False")

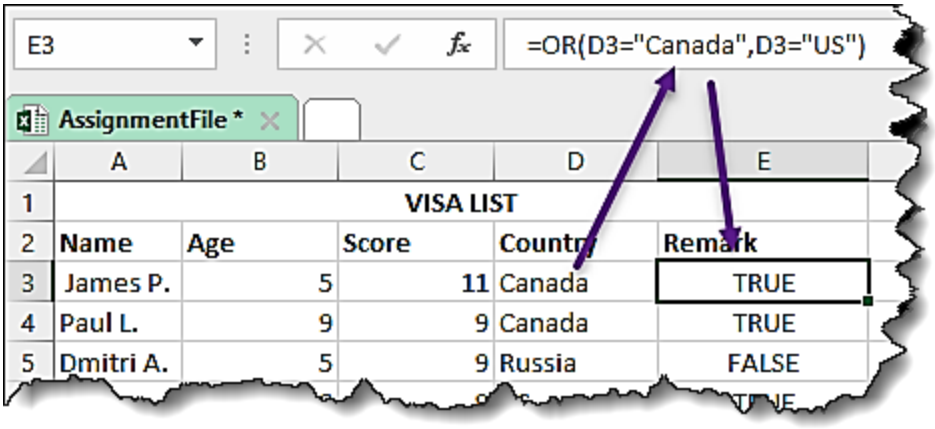


This formula will return **TRUE** if the value in cell **B3** is greater than 5 and less than 10; otherwise, it returns "**False**" if the value does not met any of the conditions.

The TRUE function can also be used with the **OR** function to return true if any of the conditions are met.

For example, to check if a cell value is equal to "**Canada**" or "**US**" the **OR** function will look like this:

=OR(D3="Canada",D3="US")



To return "**TRUE**" when the condition is met, use the **TRUE** function in combination with the **OR** function entering the formula like this;

=IF(OR(D3="Canada",D3="US"),TRUE,"False").

The above formula will return **TRUE** if the value in cell **D3** is "Canada" or "US", and "False" if the value is not "Canada" or "US".

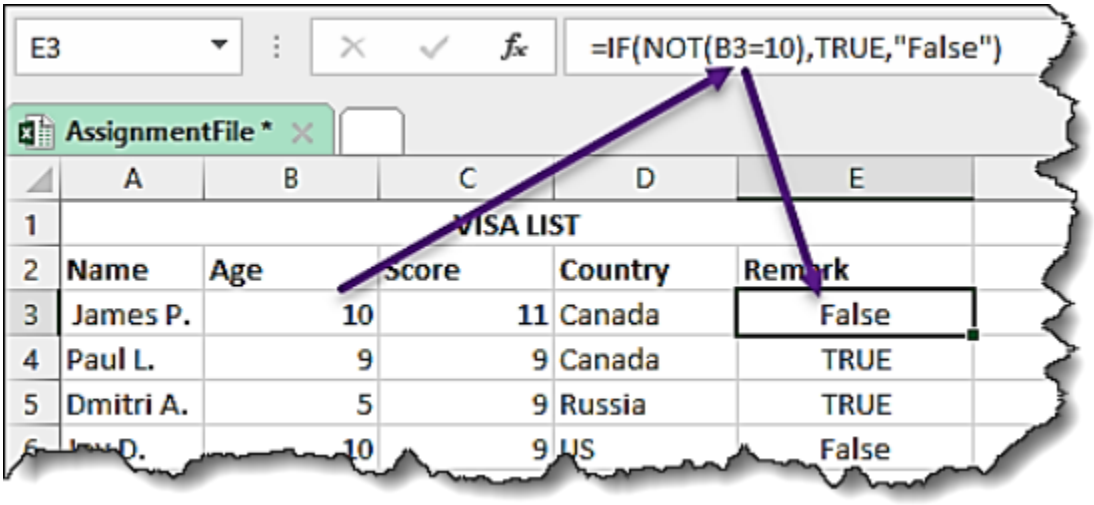
You can also use the TRUE function, combined with the NOT function, to return TRUE if the condition is false and False if the condition is True.

For example, to check if a cell value is not equal to 10, the NOT function is entered like this:

=NOT(B3=10)

However, to return a value as "**TRUE**" if the condition is met, you can use the TRUE function in combination with the **NOT** function like this:

=IF(NOT(B3=10),TRUE,"False")



This formula used in the example above will return **TRUE** if the value in cell **B3** is not equal to 10, and return "**False**" if the value in the cell is equal to 10.

FALSE FUNCTION

The FALSE function in Excel is a logical function that returns a logical value of FALSE. It is frequently employed with other logical functions such as AND, IF, and OR to create more complex formulas and make more accurate decisions based on the data.

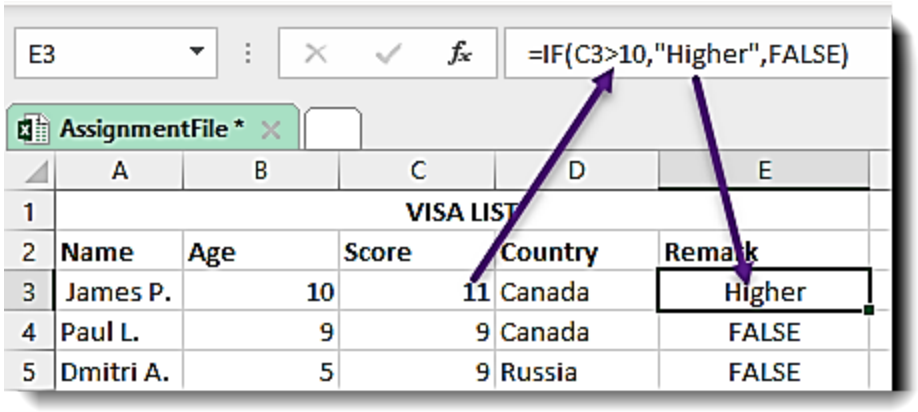
The FALSE function is often used with the **IF** function, which helps make decisions based on conditions. When you need to put the value of **FALSE** in your formula, the FALSE function can be helpful.

The FALSE function syntax is as follows;

FALSE()

For example, to check if a cell value is greater than **10** and return the value "**Higher**" if true, and "Not Higher" if false, you can use the FALSE function in combination with the IF function like this:

=IF(C3>10,"Higher",FALSE)



This formula will return "**Higher**" if the value in cell **C3** is greater than **10**, and FALSE if the value in the same cell **C3** is not greater than 10.

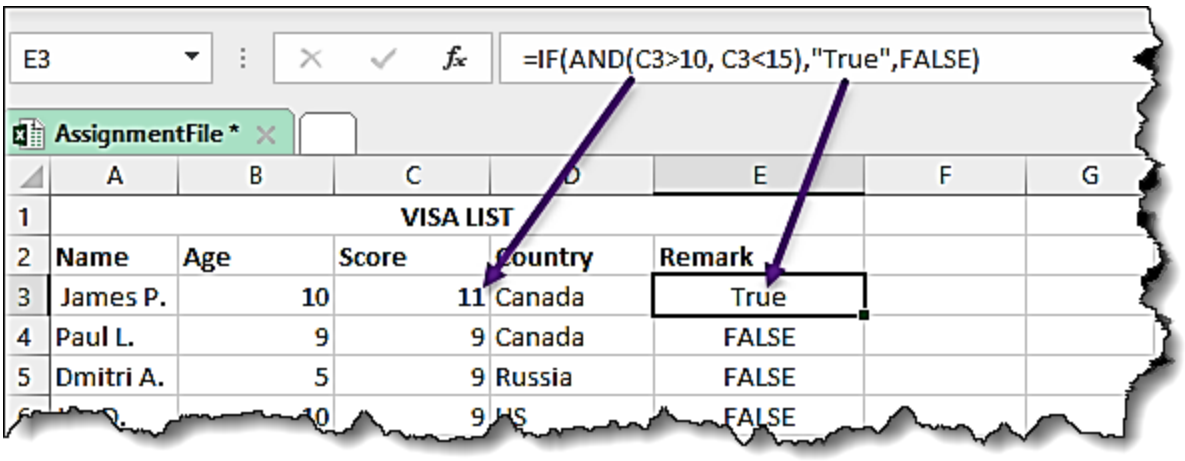
When you combine the **FALSE** function with the **AND** function, it checks multiple conditions and only returns true if all conditions you gave are met.

For example, to check if a cell value is greater than 10 and less than 15, the **AND** function is used like this:

=AND(C3>10,C3<15)

However, to return the value as **FALSE** when a specific condition is not met, you can use the **FALSE** function in conjunction with the **IF** and the **AND** function in the following way.

=IF(AND(C3>10, C3<15),"True",FALSE)



This formula in the above example returns "**True**" if the value in cell **C3** is greater than **10** and less than **15**, and **FALSE** if the value is not between **10** and **15**.

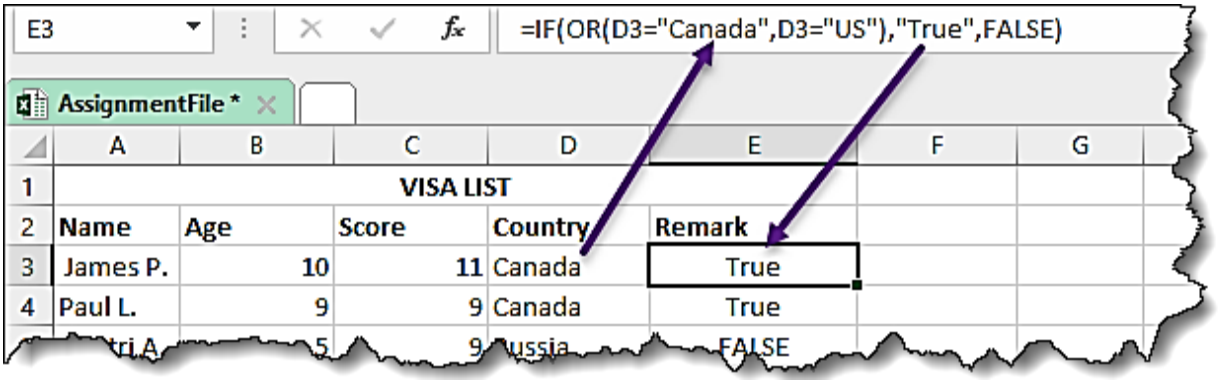
The **FALSE** function, in combination with the **OR** function, evaluates multiple conditions and returns **TRUE** if any conditions are met.

For example, to check if a cell value is equal to "**Canada**" or "**US**" you can use the **OR** function like this:

=OR(**D3**="Canada", **D3**="US")

On the other hand, if you want to return a value as **FALSE** when a particular condition is not met, you can use the **FALSE** function in conjunction with the **OR** function in the following way;

=IF(OR(D3="Canada", D3="US"),"True",FALSE)



The formula in the above example returns "**True**" if the value in cell **D3** is "**Canada**" or "**US**", and FALSE if the value is not "**Canada**" or "**US**".

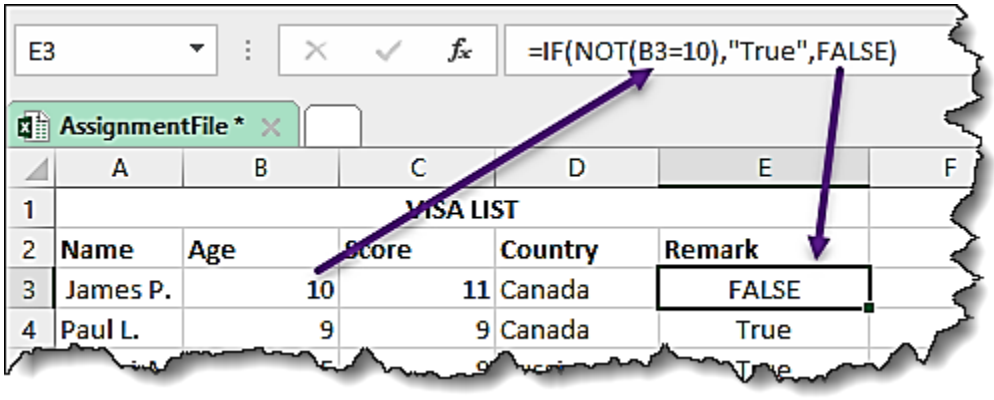
If you combine the **FALSE** function with the **NOT** function, it inverts the logical test and returns True if the condition is False and vice versa.

For example, to check if the value in cell **B3** is not equal to 10, the **NOT** function is used like this:

=**NOT**(**B3**=10)

Alternatively, suppose you wish to return the value in cell **B3** as **FALSE** when a particular condition is not met. In that case, you can use the **FALSE** function in combination with the **NOT** function in the following way:

=IF(NOT(**B3**=10),"True",FALSE)



This formula will return "True" if the value in cell **B3** is not equal to 10, and FALSE if the value in cell **B3** is equal to 10.

IFERROR FUNCTION

IFERROR function in Excel is a handy feature that helps you control and manage errors in your formulas. It examines if a formula or calculation generates an error; if found, it returns a defined value or text instead of the error message.

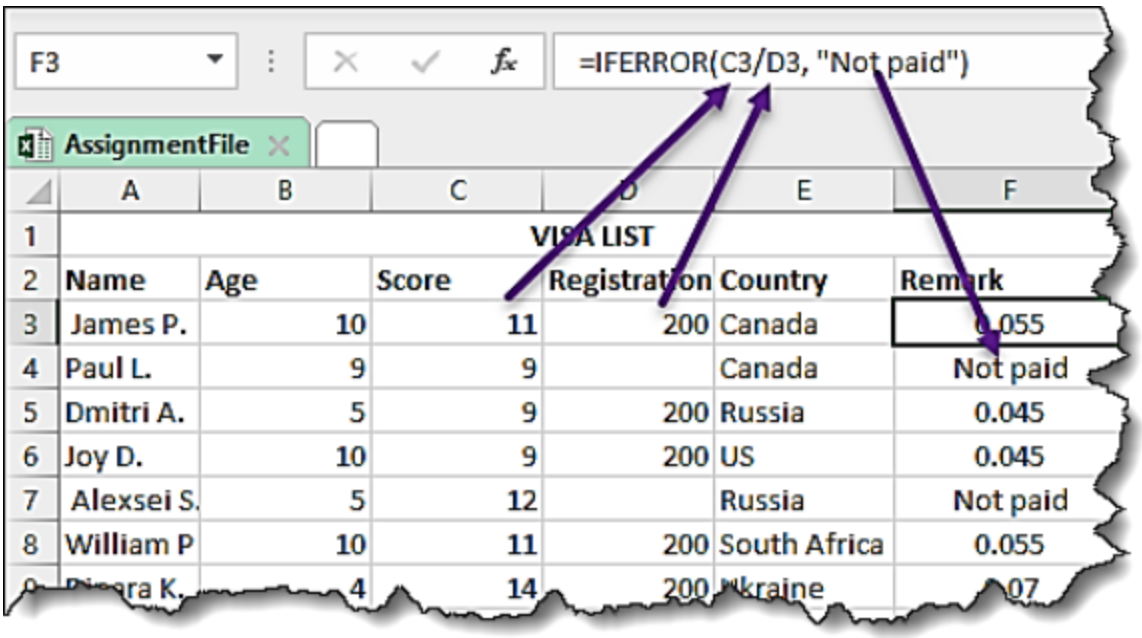
The IFERROR function syntax is:

IFERROR(value, value_if_error)

The IFERROR function requires two inputs: the **value** or formula being checked for errors and the **value_if_error** or text that should be returned if an error is identified.

For example, the formula

=IFERROR(**C3**/**D3**, "Not Paid")



	A	B	C	D	E	F
1	VISA LIST					
2	Name	Age	Score	Registration	Country	Remark
3	James P.	10	11	200	Canada	0.055
4	Paul L.	9	9		Canada	Not paid
5	Dmitri A.	5	9	200	Russia	0.045
6	Joy D.	10	9	200	US	0.045
7	Alexsei S.	5	12		Russia	Not paid
8	William P	10	11	200	South Africa	0.055
9	Diana K.	4	14	200	Ukraine	0.07

The idea is to check if dividing the value in cell **C3** by the value in cell **D3** will result in an Error because one of the cells is empty. So, it returns the text "Not paid" instead of an error message.

TEXT FUNCTIONS

Mainly used Text-based functions in Excel include;

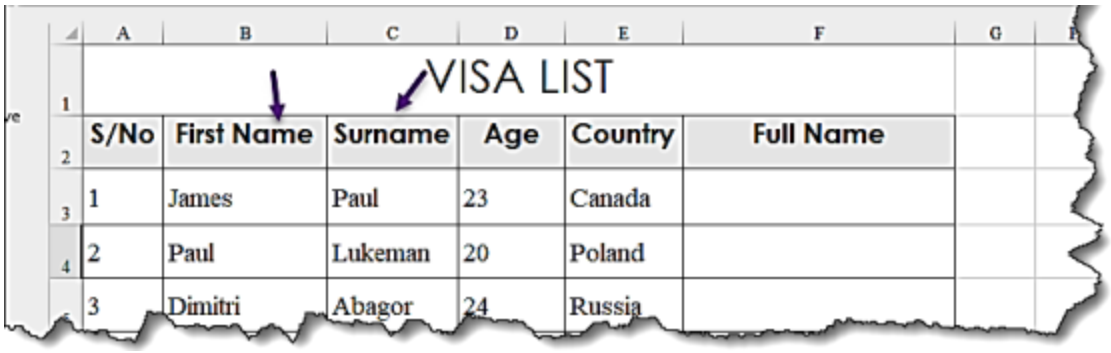
CONCATENATE FUNCTION

The CONCATENATE Function syntax is:

CONCATENATE(text1, text2, ...)

It is a function used to combine multiple text strings into one.

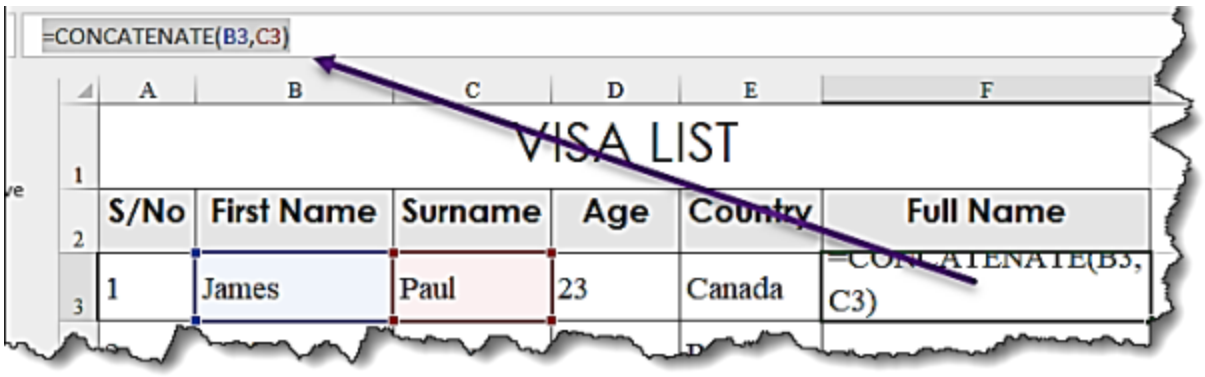
For example, if you have two columns **A** and **B** used to enter the **First Name** and the **Surname** in separate cells in a worksheet.



VISA LIST

S/No	First Name	Surname	Age	Country	Full Name
1	James	Paul	23	Canada	
2	Paul	Lukeman	20	Poland	
3	Dimitri	Abagor	24	Russia	

The **CONCATENATE** function can be used to combine the content in cell **A3** and **B3** into cell **G3.**



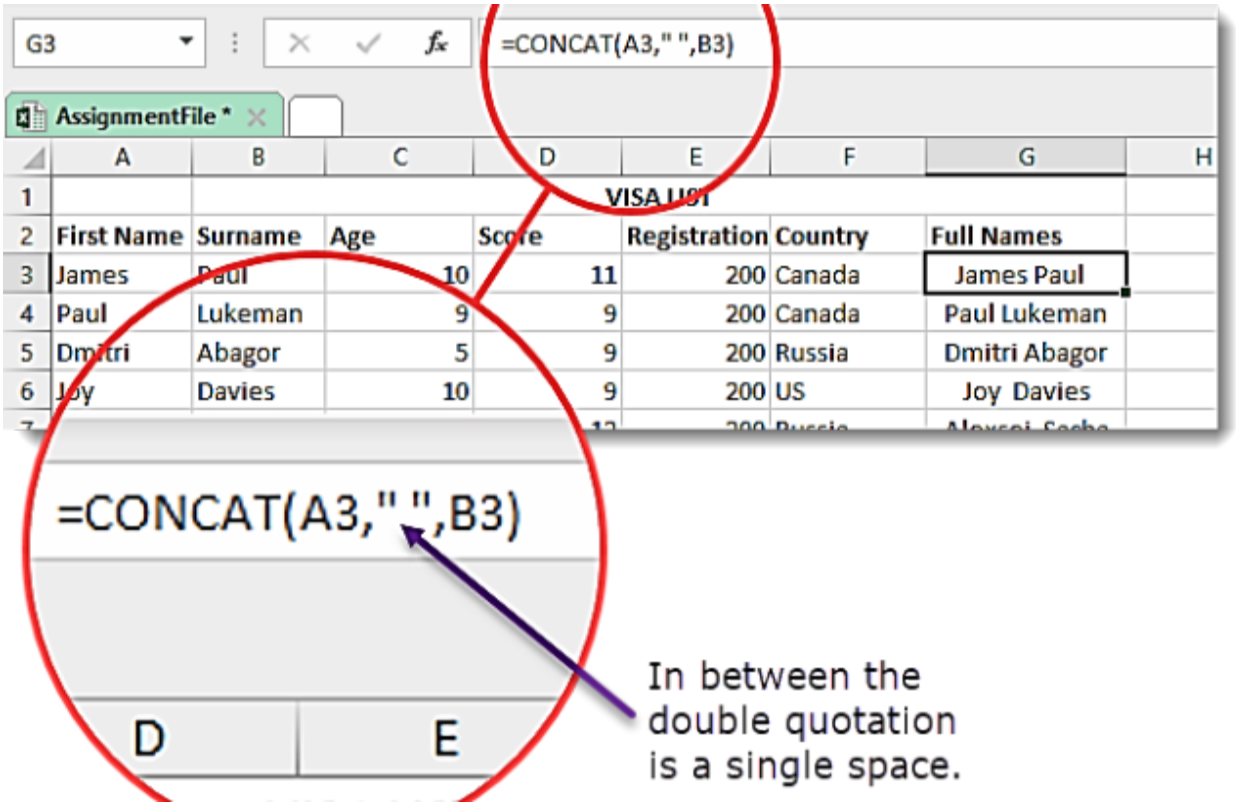
However, there is no space between the two names. To add space, you will have to use the CONCAT Function.

CONCAT FUNCTION

Similar to the **CONCATENATE** function, **CONCAT Function** allows you to join text values together but also allow using space characters, by typing a double quotation mark in place of the space character.

So the formula is now written as;

=CONCAT(A3,” “,B3)



The more space you enter between the double quotation marks, the more gap you create when you join both texts.

LEFT FUNCTION

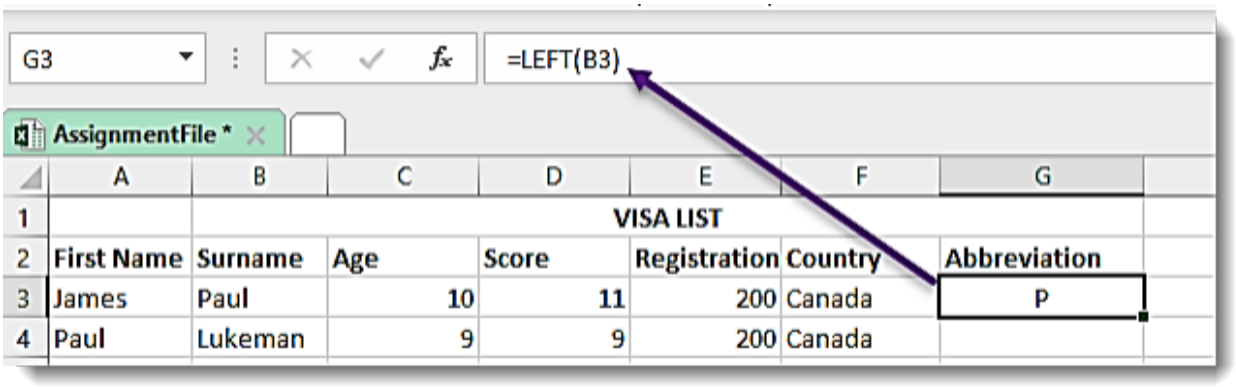
The **LEFT** function extracts a specified number of characters from the beginning of a text string. It returns the first character or characters in the original text string that satisfy the formula's conditions.

For example, if you have a very long text in a cell and only want to display the first few characters, the **LEFT** function can help extract and display a specified amount of characters from the beginning of the text string.

The **LEFT** Function Syntax is:

LEFT(text, number of characters)

However, the **LEFT** function chooses **1** as its default number of characters to display, except you specify a number that must be greater than 0.



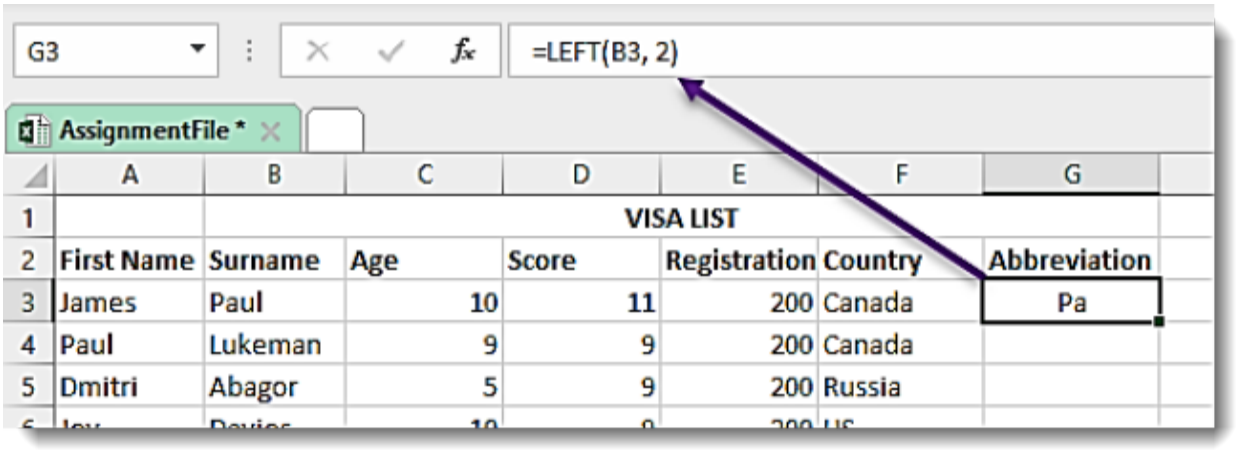
	A	B	C	D	E	F	G
1		VISA LIST					
2	First Name	Surname	Age	Score	Registration	Country	Abbreviation
3	James	Paul	10	11	200	Canada	P
4	Paul	Lukeman	9	9	200	Canada	

Using the **LEFT** function without specifying the number of characters to extract forces the formula to use the default number 1.

In the example given, the **LEFT** function was used to create an abbreviation of the name in cell **B3** by extracting the first letter of the Text.

If you want to retrieve the 2 first letters, the formula will become:

=LEFT(B3, 2)



	A	B	C	D	E	F	G
1		VISA LIST					
2	First Name	Surname	Age	Score	Registration	Country	Abbreviation
3	James	Paul	10	11	200	Canada	Pa
4	Paul	Lukeman	9	9	200	Canada	
5	Dmitri	Abagor	5	9	200	Russia	

RIGHT FUNCTION

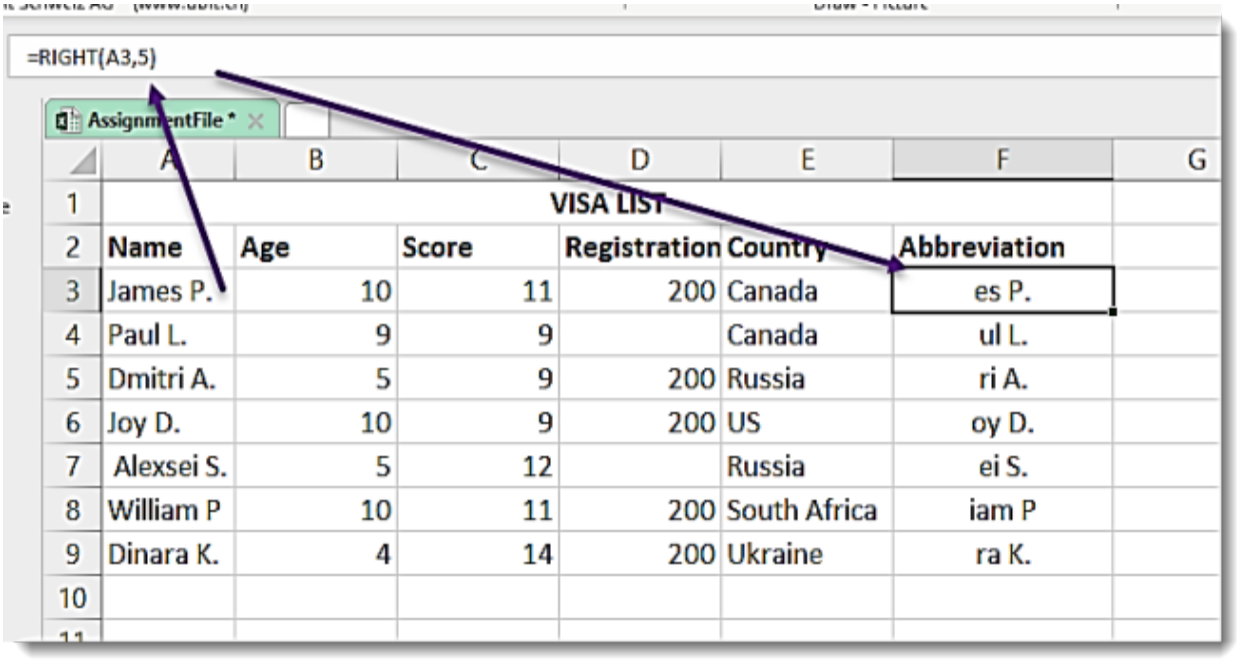
The RIGHT function is quite similar to the LEFT function, but it extracts a specific number of characters from the right side of a text string.

RIGHT Function Syntax is: RIGHT(text, number of characters)

For example, the **RIGHT** function can be used to extract the last **5** characters from a long text string in cell **A3,** as illustrated below.

Using the formula;

=RIGHT(A3,5)



	A	B	C	D	E	F	G
1	VISA LIST						
2	**Name**	**Age**	**Score**	**Registration**	**Country**	**Abbreviation**	
3	James P.	10	11	200	Canada	es P.	
4	Paul L.	9	9		Canada	ul L.	
5	Dmitri A.	5	9	200	Russia	ri A.	
6	Joy D.	10	9	200	US	oy D.	
7	Alexsei S.	5	12		Russia	ei S.	
8	William P	10	11	200	South Africa	iam P	
9	Dinara K.	4	14	200	Ukraine	ra K.	
10							

UPPER FUNCTION

The UPPER function in Excel proves to be a valuable asset when converting text to all uppercase letters. This function is convenient when dealing with a vast amount of data as it enables swift and uncomplicated text standardization.

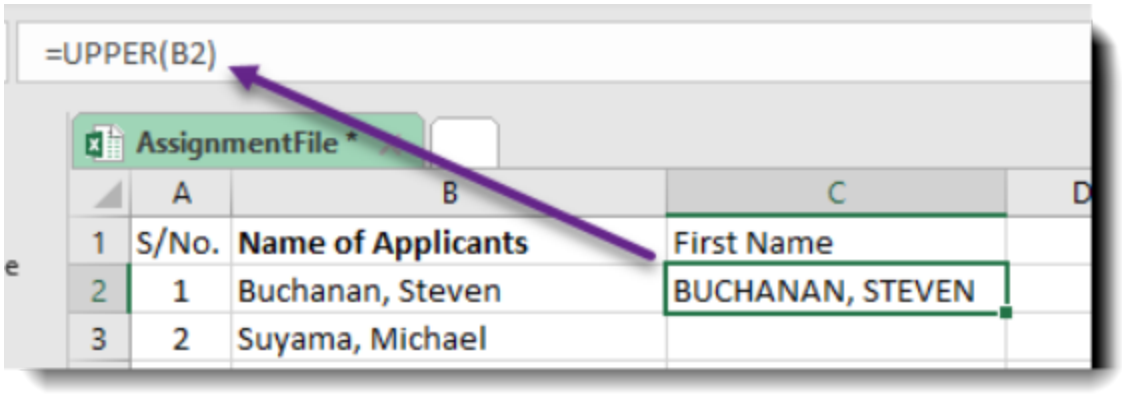
The UPPER function syntax is as follows:

=UPPER(text)

The UPPER function is a straightforward tool in Excel that requires a single input: the text you wish to change to all uppercase letters.

For example, if you wanted to convert the text in cell **B2** to uppercase letters, you would use the formula:

=UPPER(B2)



The result is "**BUCHANAN, STEVEN**" all in Uppercase.

When you are dealing with a substantial amount of data, being consistent in the format of the input is essential. For instance, when compiling customer names, it is crucial to keep the case of the names uniform.

	A	B	C	D
1	S/No.	**Name of Applicants**	**Full Name**	
2	1	Buchanan, Steven	BUCHANAN, STEVEN	
3	2	SUYAMA, Michael	SUYAMA, MICHAEL	
4	3	Paul, Margaret	PAUL, MARGARET	

The UPPER function makes it simple to convert all names to uppercase letters, making it effortless to detect any discrepancies in the data.

LOWER FUNCTION

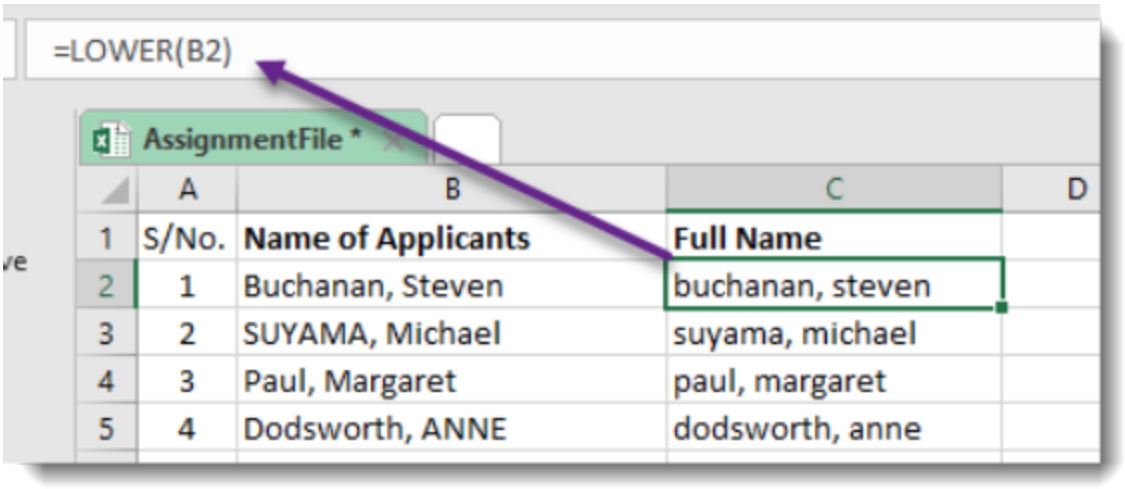
The LOWER function in Excel, enables you to change the text in a cell to lowercase. It's useful when dealing with mixed-case text data as it allows for standardizing the case of text for sorting, filtering, and other forms of data manipulation.

The UPPER function syntax is as follows:

=UPPER(text)

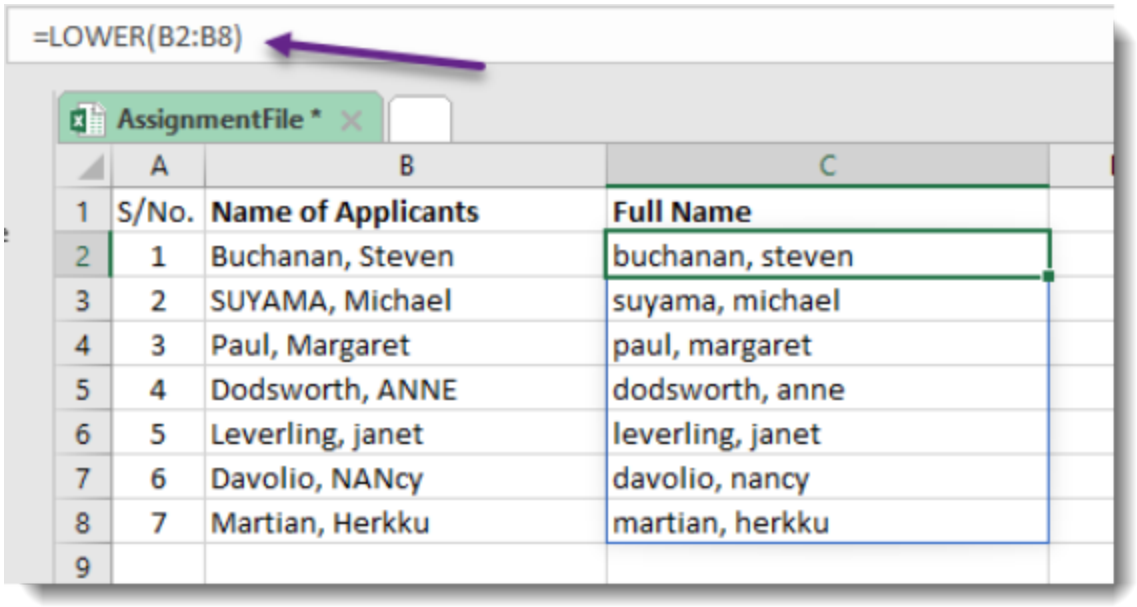
Where "text" is the specified cell or range of cells with the text you want to convert to lowercase.

For example, if cell **B2** contains the text " Buchanan, Steven" using the LOWER function would convert the text in cell B2 to " buchanan, steven"



	A	B	C	D
1	S/No.	**Name of Applicants**	**Full Name**	
2	1	Buchanan, Steven	buchanan, steven	
3	2	SUYAMA, Michael	suyama, michael	
4	3	Paul, Margaret	paul, margaret	
5	4	Dodsworth, ANNE	dodsworth, anne	

The **LOWER** function also enables the conversion of text in a range of cells by selecting the range of cells to be converted and entering "=LOWER(B2:B4)" into a designated cell, with B2:B4 representing the specific range of cells to be transformed to lowercase.



The cell range from **C2** to **C8** can be filled by entering the formula in cell **C2** alone. Which is:

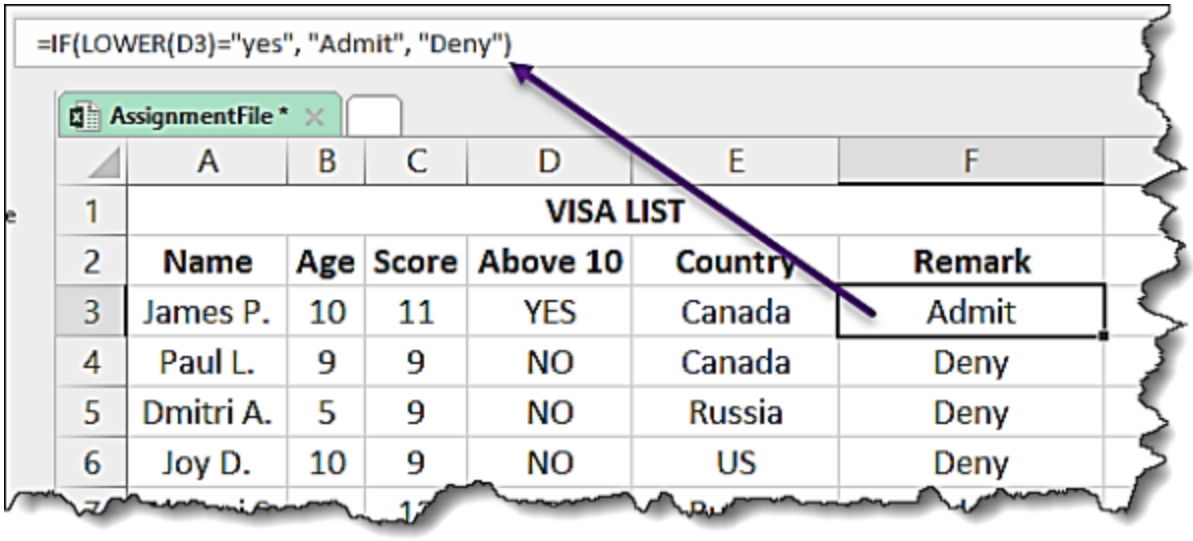
=LOWER(B2:B8)

You can also combine the LOWER function with other Excel functions, like the **IF** function, to create dynamic and advanced formulas.

For instance, when used together, the IF and LOWER functions automatically convert the text in a range of cells to lowercase based on specific conditions.

An illustration of using the **IF** and **LOWER** functions in conjunction is as follows:

=IF(LOWER(D3)="yes", "Admit", "Deny")



In the above illustration, the **LOWER** function was used to convert the text in cell **D3** to lowercase, and the **IF** function checks if the lowercase text in **D3** is equal to "yes". If it is, the formula returns "Admit"; otherwise, it returns "Deny".

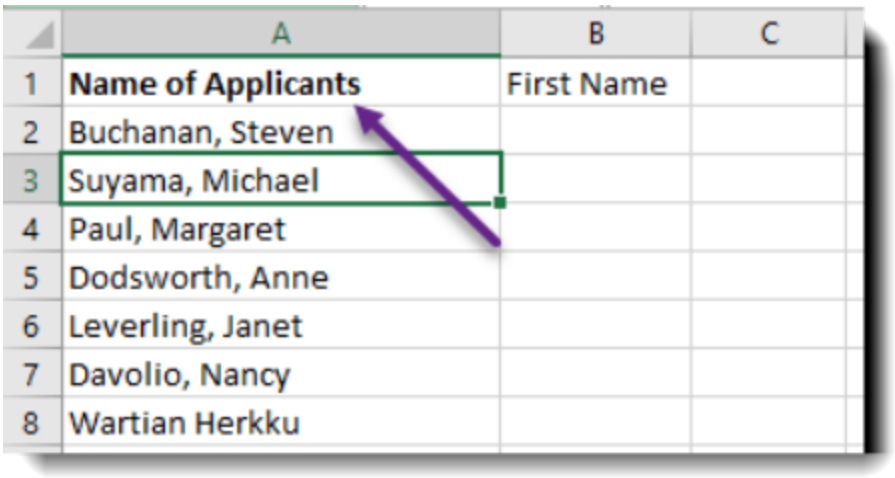
MID FUNCTION

The MID function is an Excel function that extracts a particular portion of a text string from a larger text string. It requires three arguments: the text string, the starting position of the desired text, and the number of characters to be extracted from the text string.

The MID Function Syntax is:

MID(text,start_position,number_of_characters)

For example, if you have a column to fill in the name of job applicants, you can use the MID function to extract their **First names**.



	A	B	C
1	**Name of Applicants**	First Name	
2	Buchanan, Steven		
3	Suyama, Michael		
4	Paul, Margaret		
5	Dodsworth, Anne		
6	Leverling, Janet		
7	Davolio, Nancy		
8	Wartian Herkku		

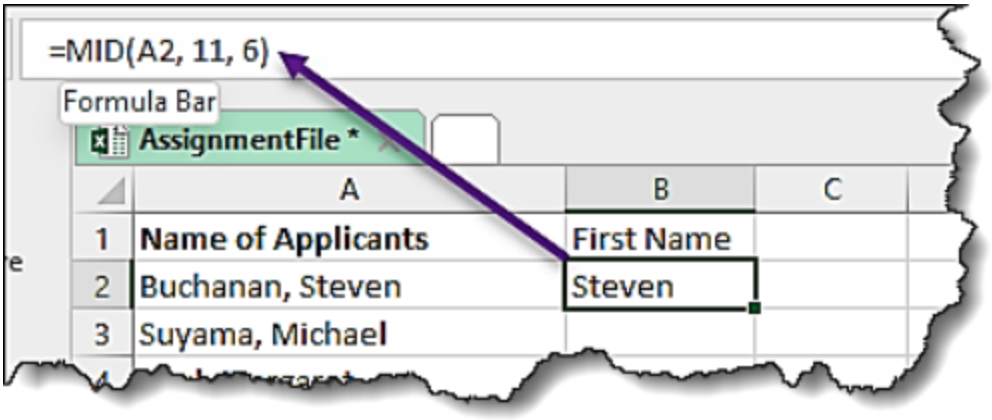
Suppose you want to extract the content of cell **A2** with the text "***Buchanan, Steven***" to extract the word "***Steven***".

The MID function formula will be

=MID(A2, 11, 6)

Where **A2** is the cell containing the text. The function would return "***Steven***" because it starts at the 11th character (including the space between)

and extracts 6 characters.



Excel allows you to combine other Text functions with the MID function, such as the LEFT and the RIGHT function, to extract specific parts of a Text string.

For example, using the formula in cell **B2**:

=LEFT(A2, 8) & MID(A2, 8, 3) & RIGHT(A2, 6)

The formula would return "**Buchanan, Steven**".

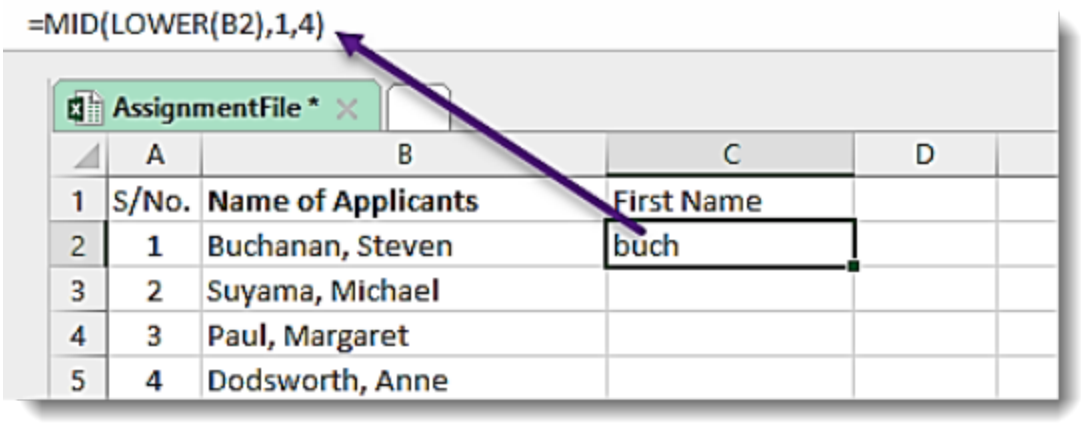
When adding the MID Function with other Excel functions, Text case sensitivity is something you should note, such as the UPPER function or the LOWER Function.

For example, the LOWER or UPPER Excel function can be used in a formula when comparing "Steven" and "STEVEN" as different by converting the cell content to the same case before using the MID function. This can be useful in circumstances where the case of the text in a cell may vary, but the information contained within the text should be considered the same.

A simple example of how the LOWER function might be used in conjunction with the MID function in Excel is shown below:

Assuming you want to extract the first four letters from a list of names in column **B** regardless of the case. You can use the following formula:

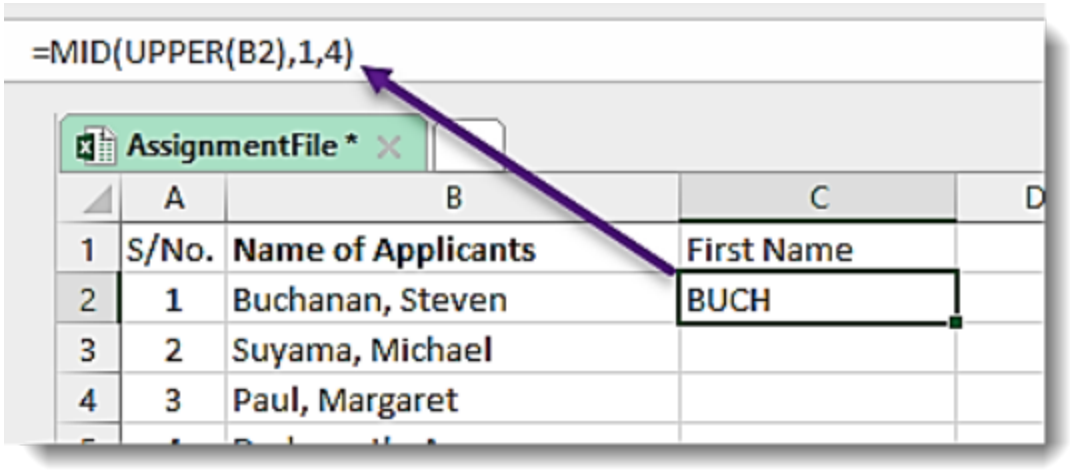
=MID(LOWER(B2),1,4)



The formula in the above illustration utilizes the MID function to extract the first four letters of the text in cell **B2** after converting it to lowercase with the LOWER function.

Compared to using UPPER function:

=MID(UPPER(B2),1,4)



The formula changes the text in cell **B2** to Uppercase with the UPPER function and retrieves the first four letters of the capitalized text using the MID function.

LEN FUNCTION

The LEN function in Excel is used in determining the number of characters within a given text string. This function is beneficial when working with large datasets and can be used in different ways to aid in the organization and analysis of data.

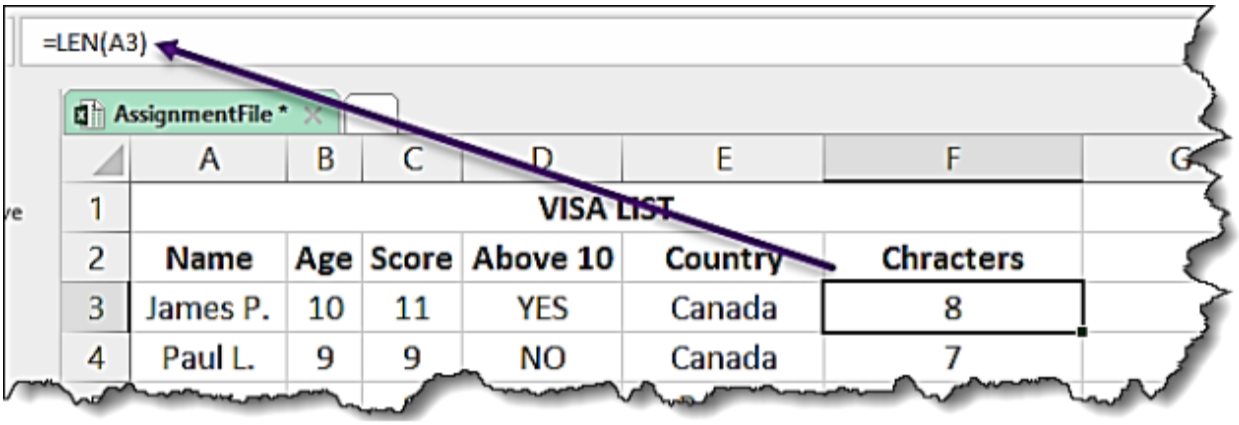
The **syntax** for the LEN function is:

LEN(text)

For example, to use the LEN function, type the formula:

=LEN(**A3**)

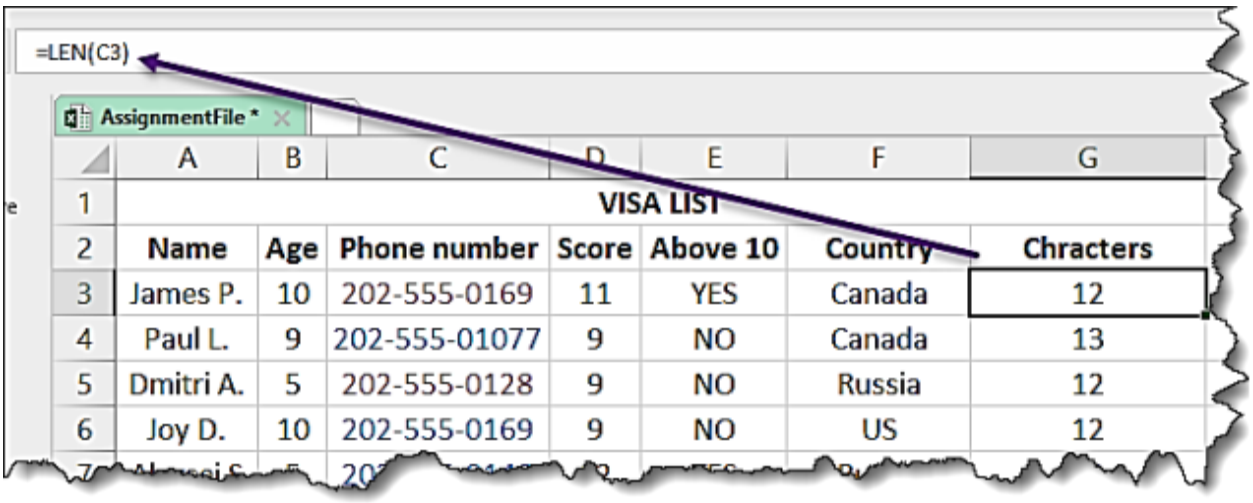
The cell **A3** contains the text that you want to measure the length within the parentheses.



The function returns the number of characters and spaces within the text in Cell **A3**. As illustrated above, the number of characters in the word "James P." is 8, which includes the space between the letter **s** and **P**.

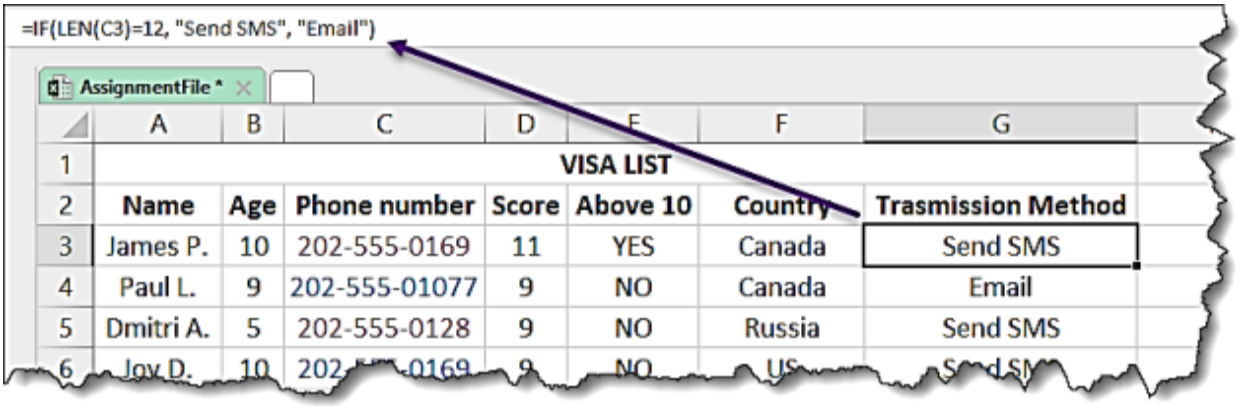
One of the most frequent applications of the **LEN** function is for validating data. This feature can help ensure that the data entered into a

worksheet conforms to specific criteria, such as having a certain number of characters. For instance, as illustrated below, you can use the LEN function to check if a telephone number is 10 digits (or 12 characters) long.



	A	B	C	D	E	F	G
1	VISA LIST						
2	Name	Age	Phone number	Score	Above 10	Country	Chracters
3	James P.	10	202-555-0169	11	YES	Canada	12
4	Paul L.	9	202-555-01077	9	NO	Canada	13
5	Dmitri A.	5	202-555-0128	9	NO	Russia	12
6	Joy D.	10	202-555-0169	9	NO	US	12

You can combine the LEN function with other Excel functions to create more complex formulas. This includes joining the LEN function with the IF function to create a formula that returns a value based on the length of a text string, thereby creating a custom formula that carries out calculations based on specific data points.



	A	B	C	D	E	F	G
1	VISA LIST						
2	Name	Age	Phone number	Score	Above 10	Country	Trasmission Method
3	James P.	10	202-555-0169	11	YES	Canada	Send SMS
4	Paul L.	9	202-555-01077	9	NO	Canada	Email
5	Dmitri A.	5	202-555-0128	9	NO	Russia	Send SMS
6	Joy D.	10	202-555-0169	9	NO	US	Send SMS

In the above illustration, the LEN and **IF** functions were used to check if the content of cell **C3** is equal to 12 characters. If true, an SMS is sent to the individual using their phone number. If False, the individual is sent the same message through their email address.

LOOKUP FUNCTIONS

Lookup functions allow you to search through a column, row, or range of cells and retrieve specific data. They enable you to find a particular value or piece of information within a large dataset and display it in a cell or range of cells.

Lookup functions allow referencing a cell to match values in another row or column, thereby retrieving corresponding results from those rows and columns.

Common Feature of LOOKUP functions includes;

- Ability to locate an accurate or suitable equivalent
- Ability to look for information along the column and row in a worksheet.
- It is easier to use and does not need you to select the whole worksheet.

FORMS OF EXCEL LOOKUP FUNCTIONS

There are two forms of LOOKUP in Excel:

- **Vector**: The vector form searches for a value in a specified column or row.
- **Array**: The array form searches for a particular value in the first column or row of the array and retrieves a value within the exact location in the last column or row of the array.

Both forms have their syntax and method of usage.

The Vector form of the LOOKUP function in Excel has the following syntax for its four arguments:

LOOKUP(lookup_value,lookup_vector,[result_vector])

The Array form of the LOOKUP function in Excel has the following syntax for its three arguments:

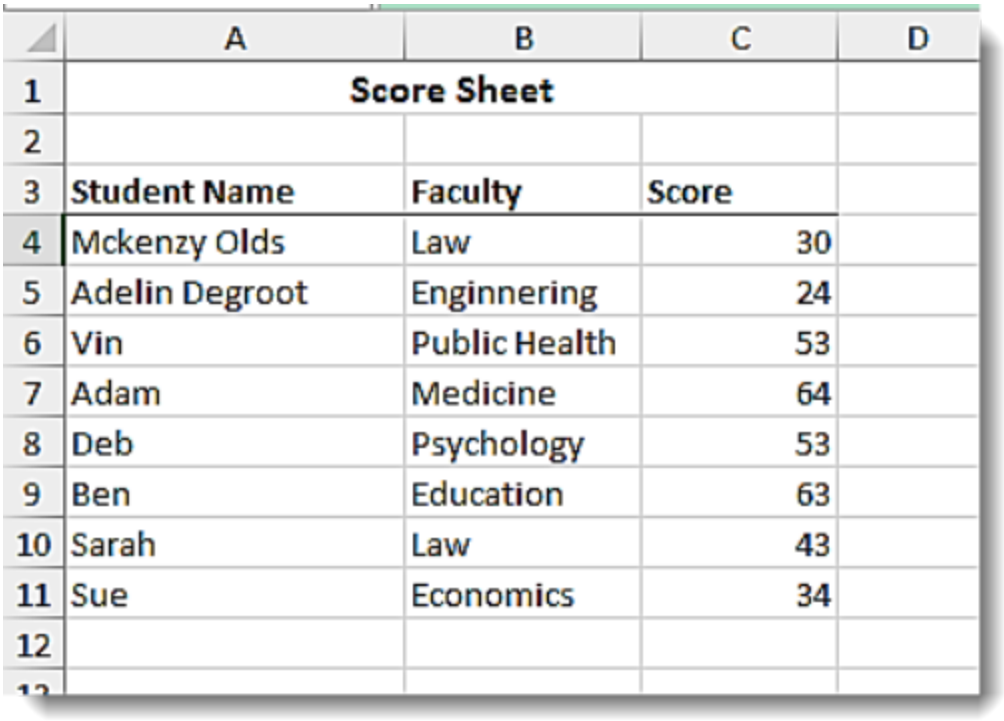
LOOKUP(lookup_value, array)

The Vector form is applicable when you don't have the exact value you are looking for and need to use a nearby value to find the exact result.

The Array form is useful when looking up a value in one column and returning a result from the same row from another column.

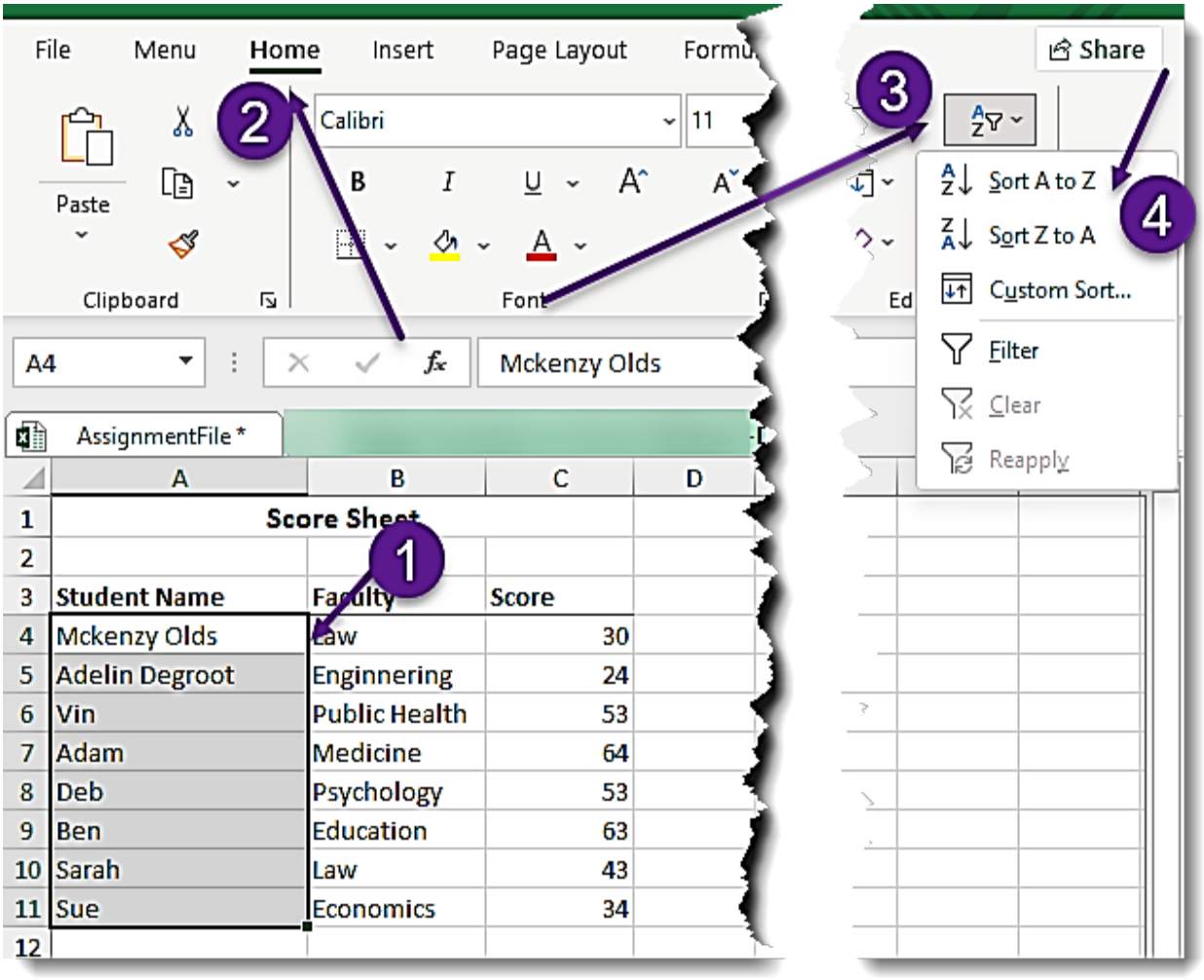
We can look at examples to understand how to use the LOOKUP Function.

Assume you have a score sheet with the Student name, faculty, and exam score as illustrated below.



	A	B	C	D
1	Score Sheet			
2				
3	**Student Name**	**Faculty**	**Score**	
4	Mckenzy Olds	Law	30	
5	Adelin Degroot	Enginnering	24	
6	Vin	Public Health	53	
7	Adam	Medicine	64	
8	Deb	Psychology	53	
9	Ben	Education	63	
10	Sarah	Law	43	
11	Sue	Economics	34	
12				

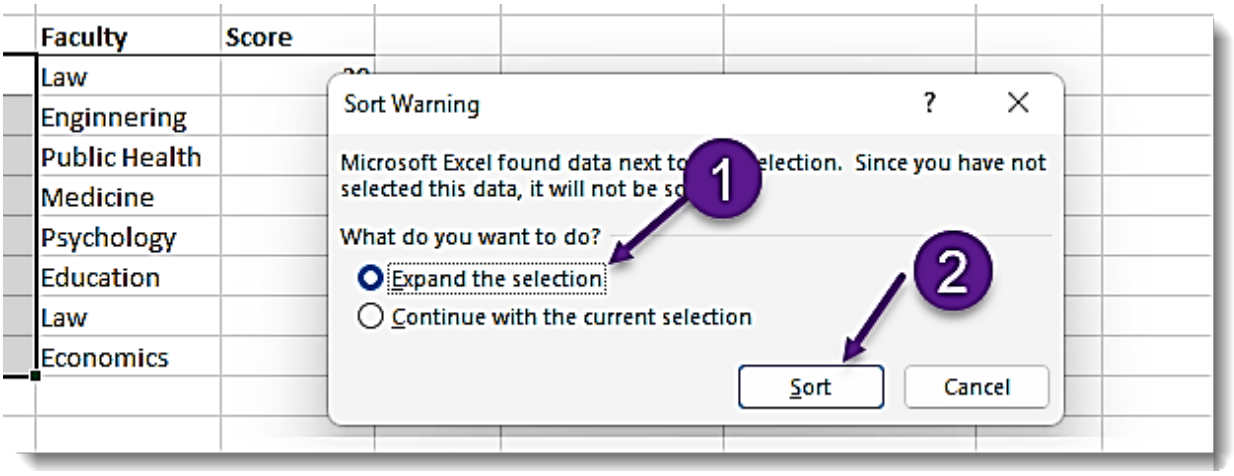
The cell range **A4** to **A11** is highlighted and then Sorted by clicking on the **Sort & Filter** command under the **Editing group** in the **Home** tab.



Next, in the drop-down menu, select **Sort A to Z.**

A dialog box will appear requesting if you want to expand the selection.

Ensure the option **Expand the selection** is selected. Next, click on the **Sort** button



This will sort the students' names along with their **Faculty** and **Score,** as illustrated below. More about data sorting and filtering will be discussed later.

Below is what the data looks like after sorting in ascending order.

	A	B	C
1	Score Sheet		
2			
3	**Student Name**	**Faculty**	**Score**
4	Adam	Medicine	64
5	Adelin Degroot	Enginnering	24
6	Ben	Education	63
7	Deb	Psychology	53
8	Mckenzy Olds	Law	30
9	Sarah	Law	43
10	Sue	Economics	34
11	Vin	Public Health	53

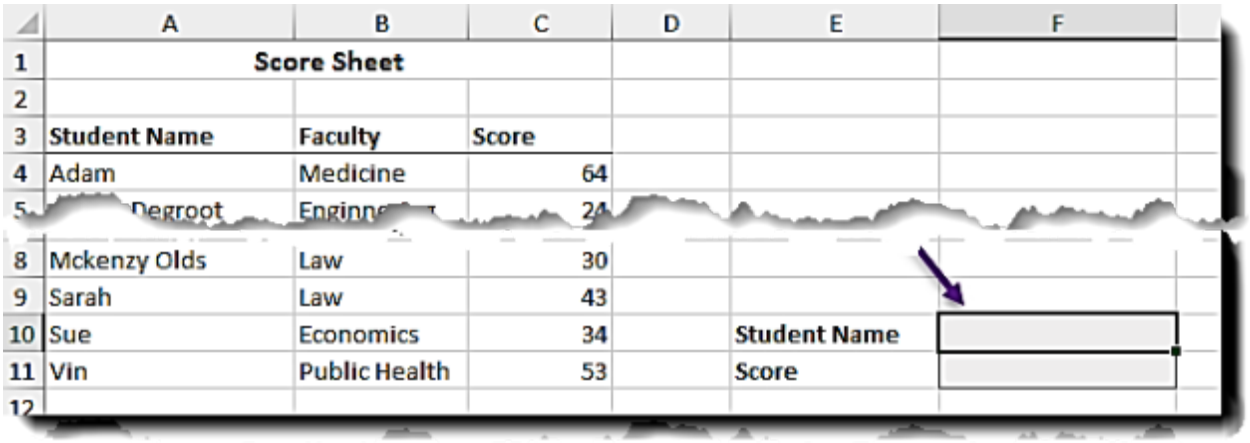
A dashboard will be used to type in the student's name. This will instantly return the score of that particular student.

Using the Vector form syntax, which is:

LOOKUP(lookup_value,table_array,col_indexnum,[result_vector]).

- The **Lookup_value** is the student's name or cell containing the data.
- The **table_array** is the range of cells **A4:A11** that comprises all the student names. However, before referring to it, **you must sort** the list (the column) in ascending order.
- The **result_vector,** is the range of cells **C4:C11** from which an expected value is to be returned. Several lookup functions in Excel can be used to retrieve data from a table or range of cells. Here are a few examples:

The dashboard area has a provision created to enter the student's name in cell **F10,** as illustrated below.



	A	B	C	D	E	F
1	Score Sheet					
2						
3	Student Name	Faculty	Score			
4	Adam	Medicine	64			
5	Degroot	Enginn	24			
8	Mckenzy Olds	Law	30			
9	Sarah	Law	43			
10	Sue	Economics	34		Student Name	
11	Vin	Public Health	53		Score	
12						

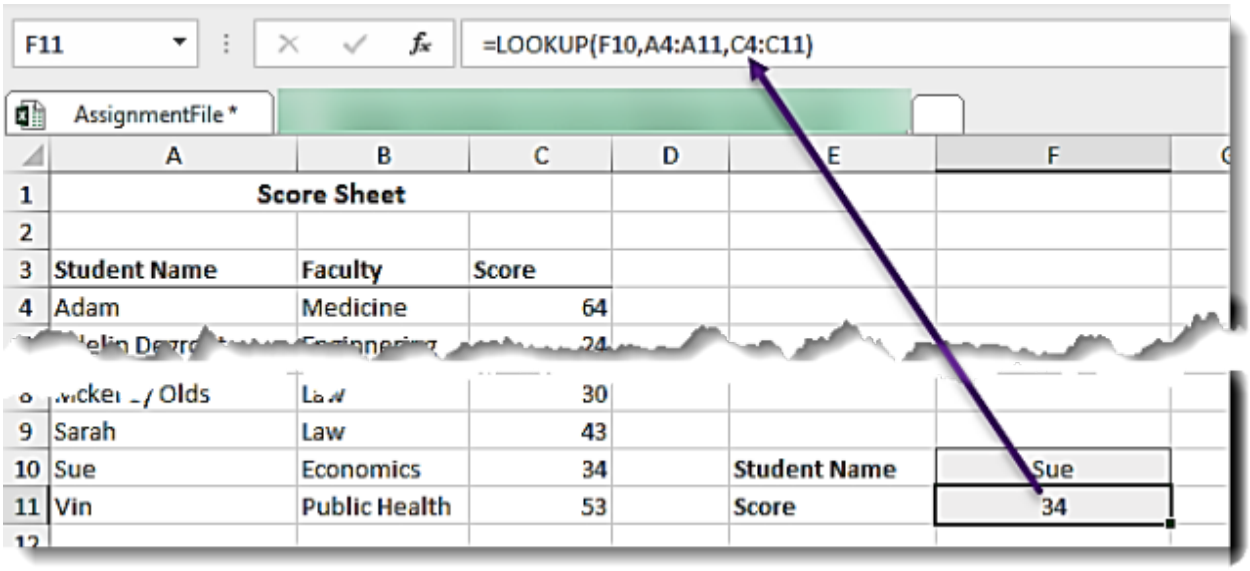
The Lookup function is placed in cell **F11**, which will search for the data in cell **F10** within the Score Sheet to automatically return the student's score.

The format of the Lookup formula entered in cell **F11**, referring to the vector form discussed earlier, is as follows:

=LOOKUP(F10,A4:A11,C4:C11)

- **F10** is the cell used to enter the data you want to look for.
- **A4:A11** is the cell range containing the data from which the search will be done.
- **C4:C11** is the value to be returned that relates to the data being searched for.

When one of the students' names is entered into cell **F10**, the score is displayed automatically in cell **F11**.



It is necessary to determine the kind of lookup needed to select the suitable formula for a particular context. Here are formulas for the most commonly used Lookups.

- VLOOKUP (Vertical Lookup)
- HLOOKUP (Horizontal Lookup)
- INDEX-MATCH
- INDEX-MATCH-MATCH

- XLOOKUP (New in Excel 365)

VERTICAL LOOKUP (VLOOKUP) FUNCTION

Vlookup also called Vertical lookup is a type of search that allows a user to input a specific value and returns the corresponding value from the same row in another column.

Excel offers a variety of methods for performing Vlookups, including:

VLOOKUP function

The VLOOKUP function in Excel is a powerful search and retrieval tool that allows you to locate data quickly.

Using the VLookup Function, you can quickly and easily retrieve a customer's information from a database without searching multiple data sheets.

If the data you want to retrieve is located in the leftmost column of your table and you don't plan on making any changes to the table's structure, it's safe to use a standard Vlookup formula.

A **VLOOKUP** function consists of the following components:

- The value you would like to look up
- The specific range within which the desired value is to be searched and the value that is returned.
- The column number within the defined range holding the returned value.
- Indicate whether you want an exact or approximate match of the desired value by using 0 or FALSE for an exact match and 1 or TRUE for an approximate match.

The Syntax for VLookup Function is as follows:

VLOOKUP([value],[range],[column number],[false or true])

In the example below, we have a list of students, their Faculty, and their score.

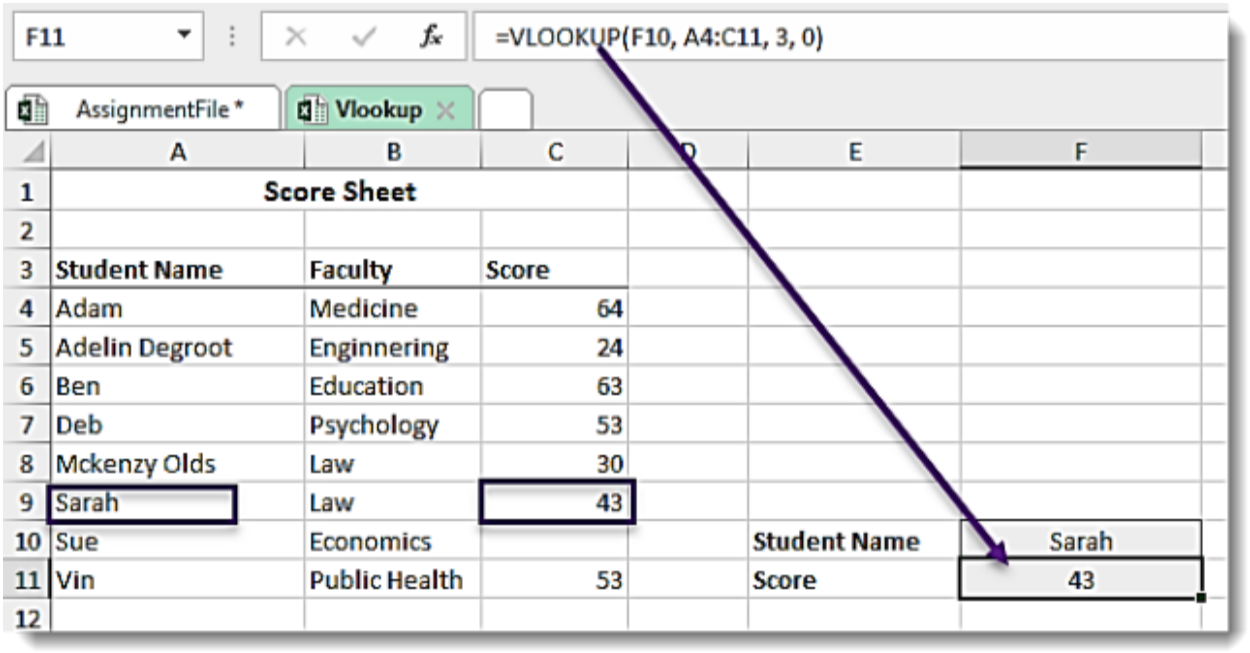
We want to find the Score of a particular student quickly in this table.

	A	B	C
1	**Score Sheet**		
2			
3	**Student Name**	**Faculty**	**Score**
4	Adam	Medicine	64
5	Adelin Degroot	Enginnering	24
6	Ben	Education	63
7	Deb	Psychology	53
8	Mckenzy Olds	Law	30
9	Sarah	Law	43
10	Sue	Economics	34
11	Vin	Public Health	53
12			

A portion of the worksheet is used to create a dashboard, where cell **F10** is used to enter the student's name, and cell **F11** is where the score will automatically appear.

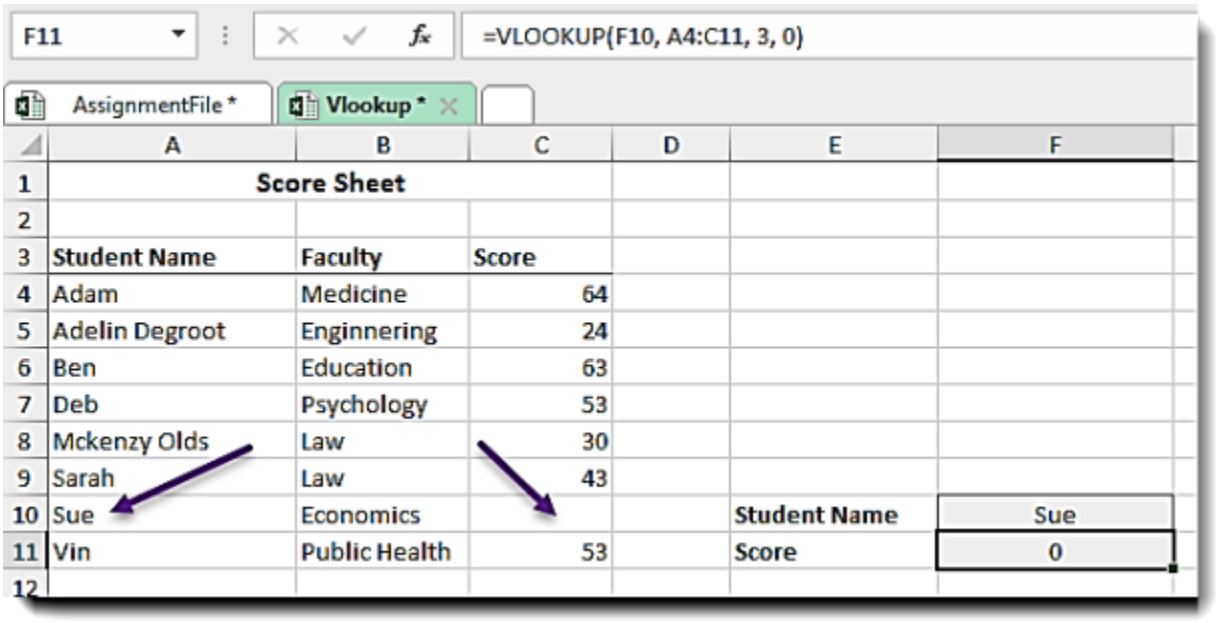
So, the VLookup formula is entered in cell **F11**:

=VLOOKUP(F10, A4:C11, 3, 0)



- **F10** is the cell containing the value to look up.
- **A4:C11** is the range that covers the portion on the worksheet used to Lookup value and the return value.
- **3** represents the column counting from the left to the right of the table. In this case, we have the **Score** in the third column.
- **0** or **FALSE** returns the value that will appear if the Score is blank.

As illustrated below, cell **C10** is blank, so the VLookup returns **0** as the score.

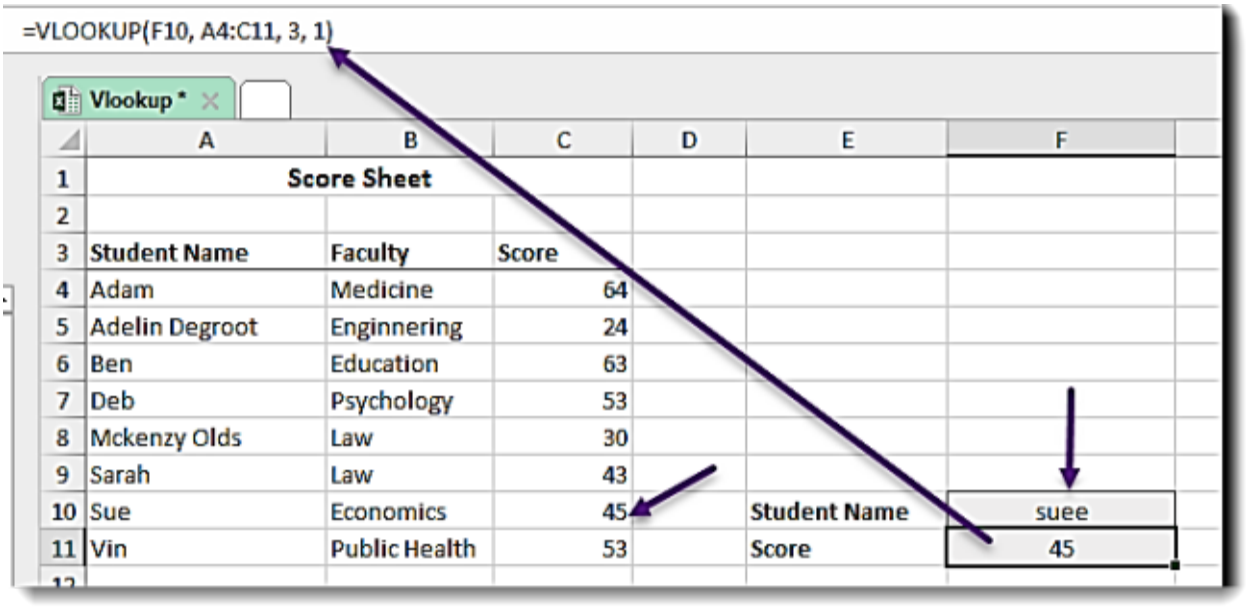


Cell **F11** displays the corresponding score along the row that holds the value '**Sue'** within the selected table array. If the text value **Suee** is entered into cell **F10**, which does not exist on the range of cells been considered, cell **F11** will return the Standard error **#N/A**. The reason behind the error is because the VLOOKUP function can't find the value **Suee** in the table array.

When the value **0** or **FALSE** in the VLookup function is changed to **1** or **TRUE**, that is:

=VLOOKUP(F10, A4:C11, 3, **1**) OR =VLOOKUP(F10, A4:C11, 3, **TRUE**)

This will force the VLookup function to find an approximate or closest match with '**Suee'**. In this case, the value '**Suee'**, is close to '**Sue**'.

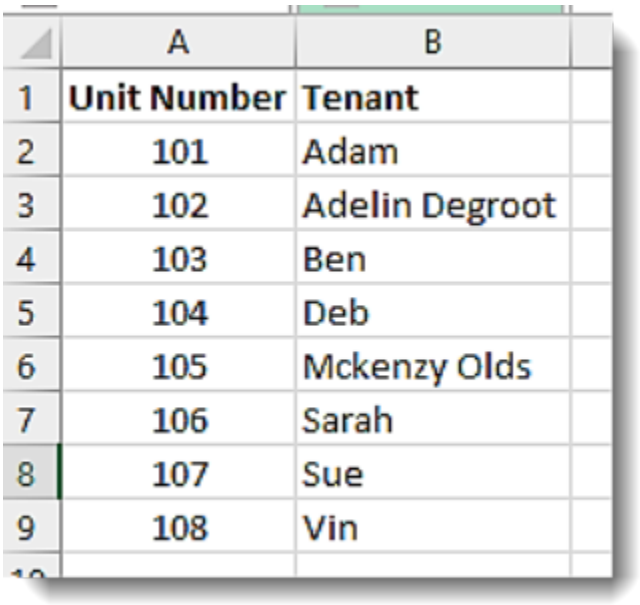


From the VLookup syntax;

VLOOKUP([value],[range],[column number],[false or true])

Remember to remove the quotation mark if you are **Looking up to a numerical value**.

For example, in the table below, you have the name of the tenants and their unit numbers.

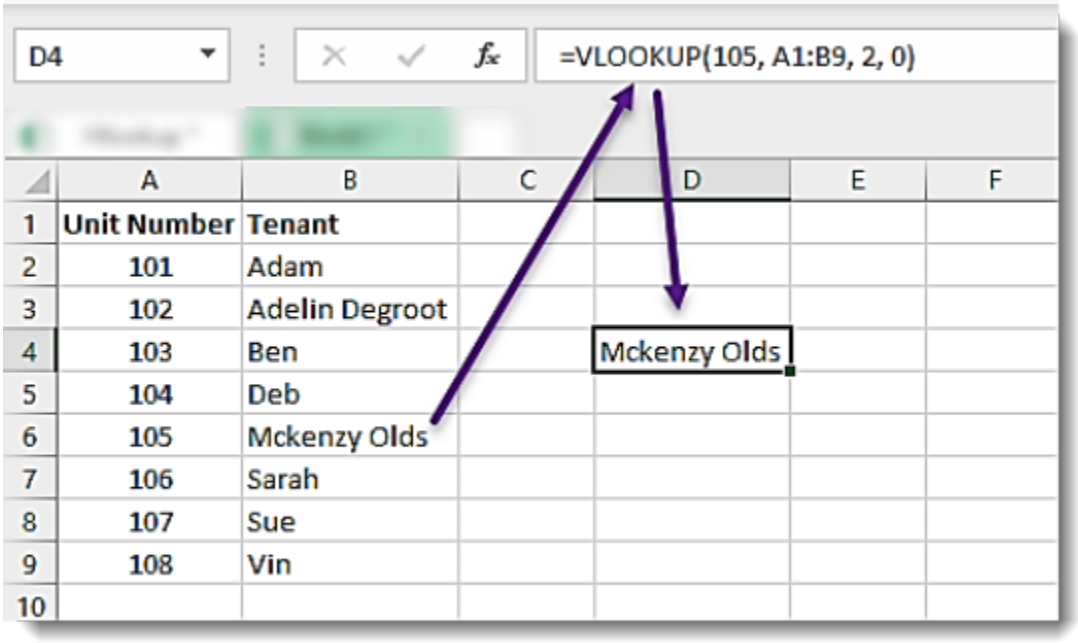


	A	B
1	**Unit Number**	**Tenant**
2	101	Adam
3	102	Adelin Degroot
4	103	Ben
5	104	Deb
6	105	Mckenzy Olds
7	106	Sarah
8	107	Sue
9	108	Vin

Using the VLOOKUP to find the tenant's name in unit number 105. The numerical value 105 should not be in a quotation mark because it is not a text value.

So the formula now becomes;

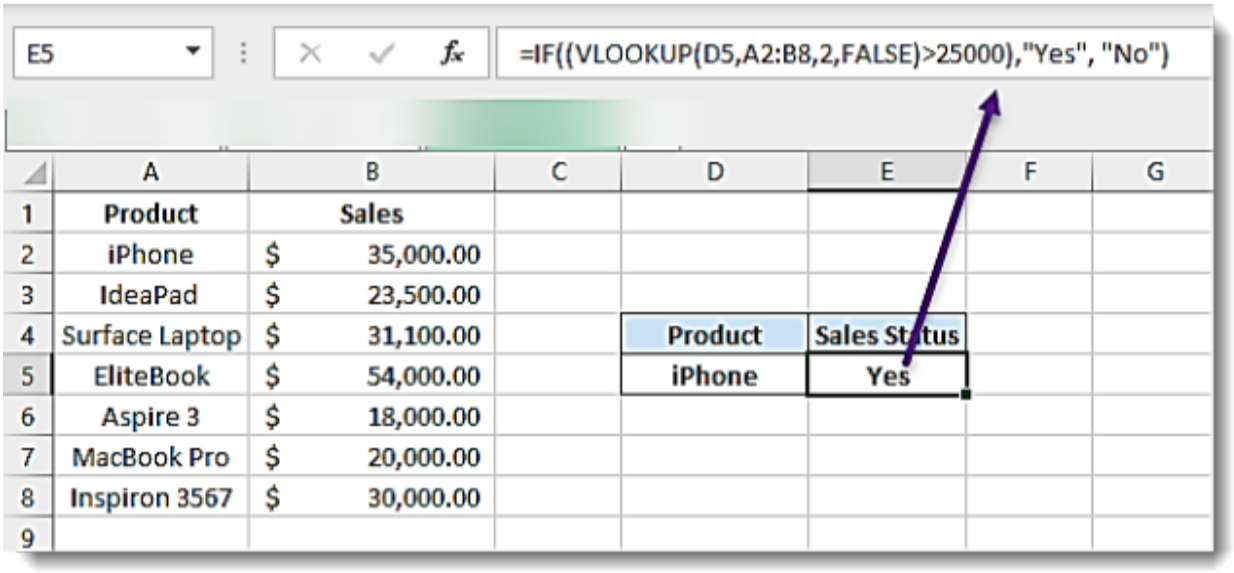
=VLOOKUP(105, A1:B9, 2, 0)



Other functions, like the **IF** function, can be combined with the VLOOKUP function. With the help of the **IF** and **VLOOKUP function**, it is possible to make comparisons between the VLOOKUP's result and another value.

Take the list in cells **A2:B8** as an example. To determine if the name written in cell **D5** has sales greater than $25,000, the following formula can be used:

=IF((VLOOKUP(D5,A2:B8,2,FALSE)>25000),"Yes", "No")



From the illustration above, the result is '**Yes'** because iPhone has sales of $35,000, which is greater than $25,000.

HORIZONTAL LOOKUP (HLOOKUP) FUNCTION

Excel's Horizontal Lookup, also called **HLookup**, comes with features that allow you to search for a specific value in a row within a dataset and retrieve the corresponding value from the same column. This function is handy when working with large amounts of data, as it allows for efficient and precise retrieval.

The HLookup syntax is as follows:

=HLOOKUP(lookup_value,table_array,row_index_number, [range_lookup])

The HLookup function in Excel searches for a specific value, 'lookup_value', within the range of cells 'table_array' you selected. Also, the 'row_index_number' in the formula indicates the row of the column where the matching value is located. And the 'range_lookup' is a true or false input you are to use to determine if the search should be an exact match or an approximate match.

For example, using the formula;

=HLOOKUP(“iPhone”, B2:C6, 2, TRUE)

The above formula is used to look for the value “iPhone” within a range of cells **B2:C6**, and to return the corresponding value from the same column in Row 2.

However, because the **range_lookup** value is already set to **TRUE**, the HLookup function will search for the closest match to “iPhone” if it cannot find an exact match.

Another example of using HLookup in Excel is to look up the score of a Student by providing the student's name.

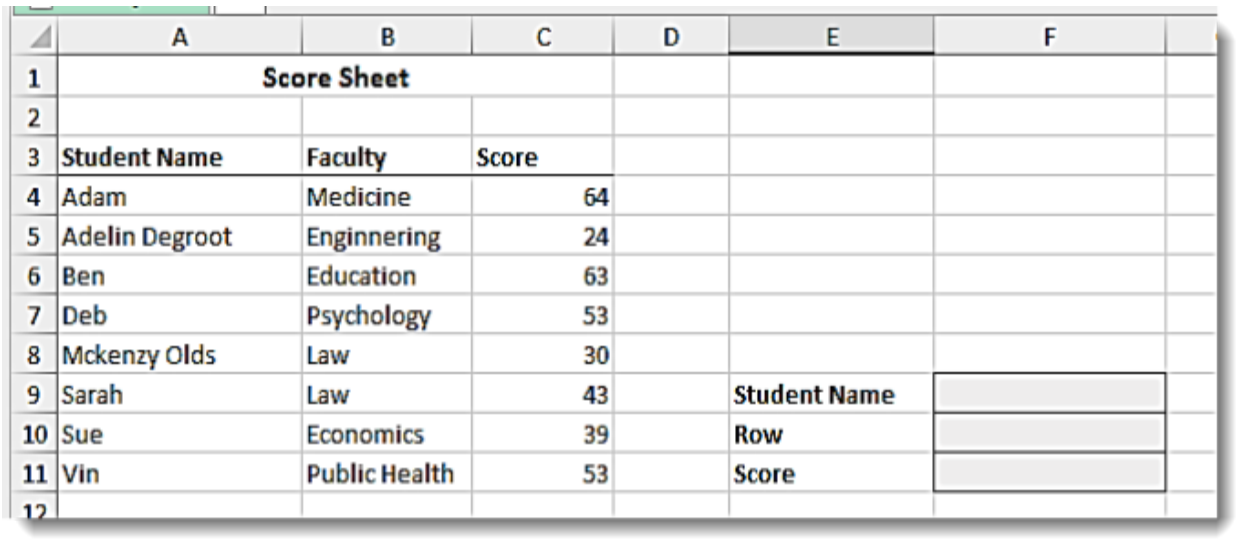
	A	B	C
1	**Score Sheet**		
2			
3	**Student Name**	**Faculty**	**Score**
4	Adam	Medicine	64
5	Adelin Degroot	Enginnering	24
6	Ben	Education	63
7	Deb	Psychology	53
8	Mckenzy Olds	Law	30
9	Sarah	Law	43
10	Sue	Economics	39
11	Vin	Public Health	53
12			

So, we have a three-column table with the student information. The first column is the student's name, and the third is their scores.

A dashboard is created using cell E9:F11 to input the lookup value and automatically display the result.

The formula used in cell **F11** to display the score is:

=HLOOKUP("Score",A3:C11,F10,FALSE)

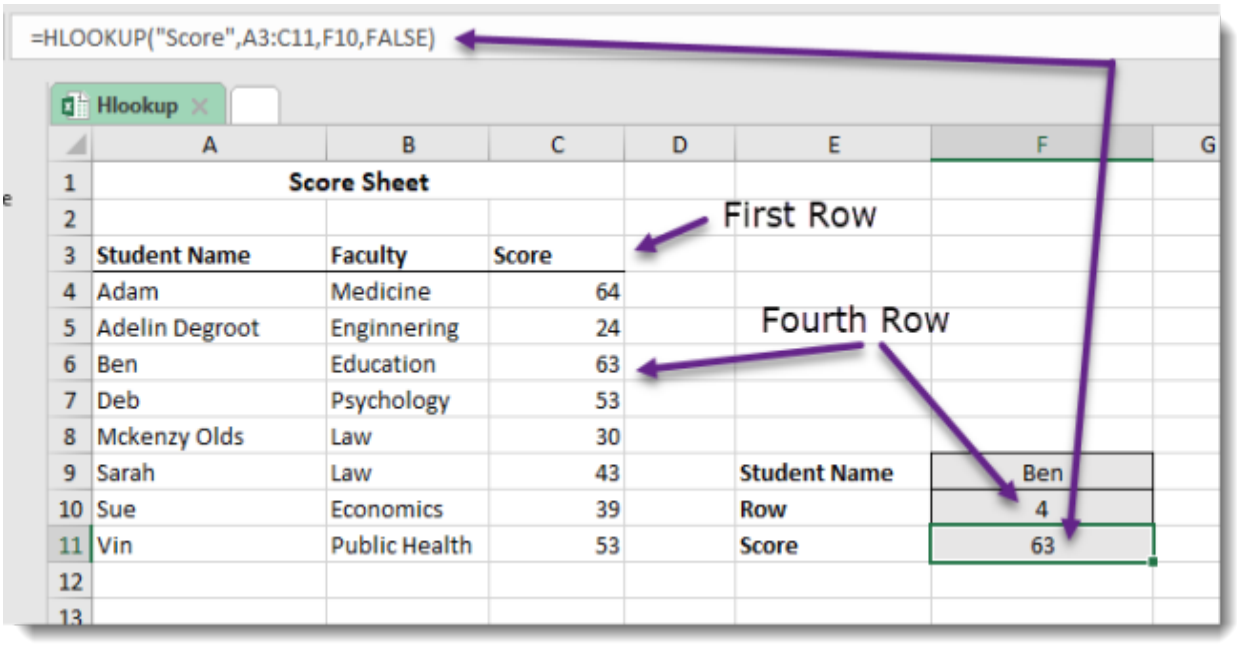


	A	B	C	D	E	F
1	Score Sheet					
2						
3	Student Name	Faculty	Score			
4	Adam	Medicine	64			
5	Adelin Degroot	Enginnering	24			
6	Ben	Education	63			
7	Deb	Psychology	53			
8	Mckenzy Olds	Law	30			
9	Sarah	Law	43		Student Name	
10	Sue	Economics	39		Row	
11	Vin	Public Health	53		Score	
12						

So the breakdown of each argument to used with respect to the HLookup syntax is:

- **lookup_value:** this is the value in cell **F9** that the function will look up from the first row of the table
- **table_array:** this is the range of cells **A3:C11** that makes up the table whose top row the function will be searching.
- **row_index_num:** This is the row number to be inputted in cell **F10** from which a matching value should be returned.
- **[range_lookup]:** Although this is optional and boolean criteria (TRUE or FALSE), Which is a logical value you use to specify if you want an approximate or exact match of the Looku_value.

Ben is the student on which the HLookup is focusing.



On the list, **Ben** is on the **Fourth row,** counting from the **First row** with reference to the cell range **A3:C11** (table_array)**.**

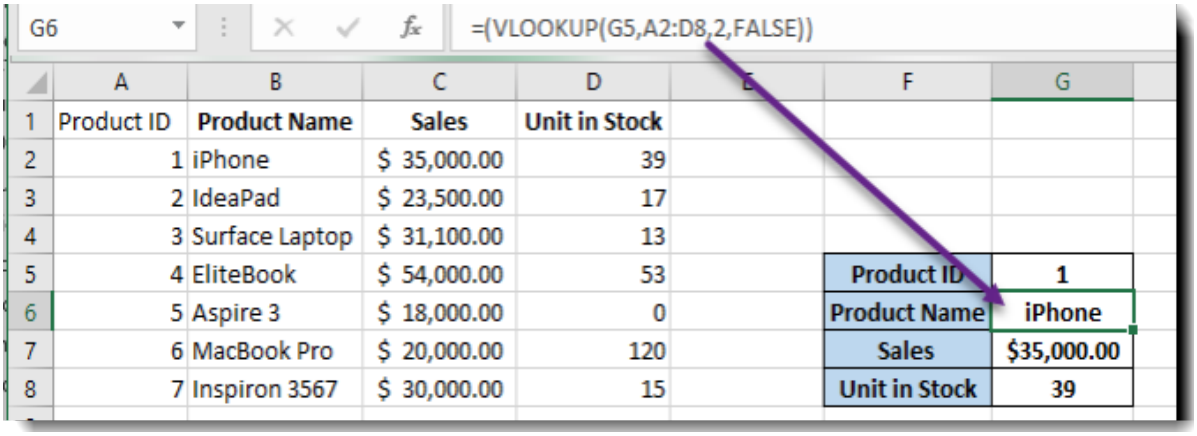
HLOOKUP in Excel operates similarly to VLOOKUP. However, instead of scanning a vertical list and finding a value from a matching column, it searches a horizontal list (row 4) and retrieves a value from a corresponding row.

The first input is the value to search for (**Score**), the second is the area to search (cell range **A3:C11)**, the third indicates how many rows below the lookup value to search (value in cell **F10)**, and the fourth determines if an approximate match should be used.

INDEX MATCH FUNCTION

The INDEX and MATCH function in Excel is a smart way of doing two-way lookups. It is an alternative you can use to overcome the limitations of VLOOKUP function. The INDEX and MATCH function provides you with an extensive flexibility once you have gotten a good understanding of how it works.

The illustration below better explains the limitation of VLookup function and why you should consider using the INDEX and MATCH function.



	A	B	C	D	F	G
1	Product ID	Product Name	Sales	Unit in Stock		
2	1	iPhone	$ 35,000.00	39		
3	2	IdeaPad	$ 23,500.00	17		
4	3	Surface Laptop	$ 31,100.00	13		
5	4	EliteBook	$ 54,000.00	53	Product ID	1
6	5	Aspire 3	$ 18,000.00	0	Product Name	iPhone
7	6	MacBook Pro	$ 20,000.00	120	Sales	$35,000.00
8	7	Inspiron 3567	$ 30,000.00	15	Unit in Stock	39

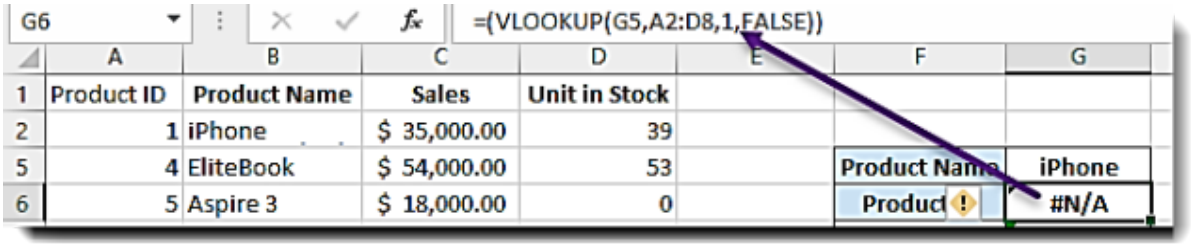
The cells range **F5**:**G8** serves as a simple information-gathering system that collects data from the cell range **A2**:**D8** using the VLOOKUP command.

The **Product ID**, entered manually in cell **G5**, is used by the VLOOKUP formula to find the desired values. The final argument (FALSE) ensures an exact match between the **Product ID** and the first column of the source data.

Constraints of VLOOKUP

- **VLOOKUP has a restriction where the search value must always be located in the first column of the reference array.** The value located to the left of the search value in the data source cannot be retrieved. This can be a significant issue when working with data you are not allowed to altered or rearranged. From the above illustration, if you are expected to enter the

Product Name, VLOOKUP would fail to return the corresponding **Product ID** due to the arrangement of the dataset.

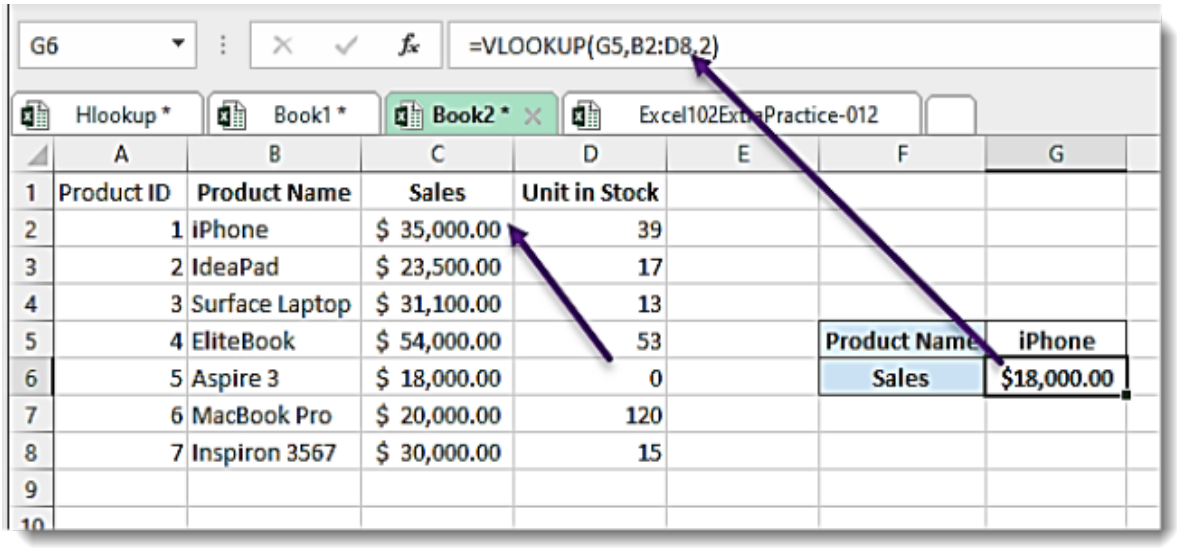


- **The range_lookup parameter in the VLOOKUP function is an optional fourth argument.** To obtain an exact match, you will either enter **FALSE** or **0**.

For that of an approximate match, **TRUE** or **1** is been used.

Most times, you will want to go for an exact match, but if the fourth argument is not specified, Excel will implement an approximate match, which may lead to wrong outcomes.

In the example below, the **VLOOKUP Function** is used in cell **G6** to locate the **Product Name** on the sales column in cell **F6**.



	A	B	C	D	E	F	G
1	Product ID	Product Name	Sales	Unit in Stock			
2	1	iPhone	$ 35,000.00	39			
3	2	IdeaPad	$ 23,500.00	17			
4	3	Surface Laptop	$ 31,100.00	13			
5	4	EliteBook	$ 54,000.00	53		Product Name	iPhone
6	5	Aspire 3	$ 18,000.00	0		Sales	$18,000.00
7	6	MacBook Pro	$ 20,000.00	120			
8	7	Inspiron 3567	$ 30,000.00	15			
9							
10							

Since the fourth argument in the formula was omitted, the formula is rather performing an approximate match. In such cases, the **VLOOKUP function** assumes the table is sorted, and it then returns the value from the previous row if it finds one that is greater than the lookup value. The correct answer should be $35,000.00, but the VLOOKUP returned $18,000.00, which is incorrect.

Therefore, it is vital to always remember to make the fourth argument either FALSE or 0 if you want to do an exact match.

Before using either the Index or Match function, sorting your data in ascending order will help give you a better result.

How to utilize the MATCH function

The **MATCH** function in Excel is an excellent tool you can use to determine the position of a particular value in a range of cells.

The syntax for the **MATCH** function in Excel is as follows:

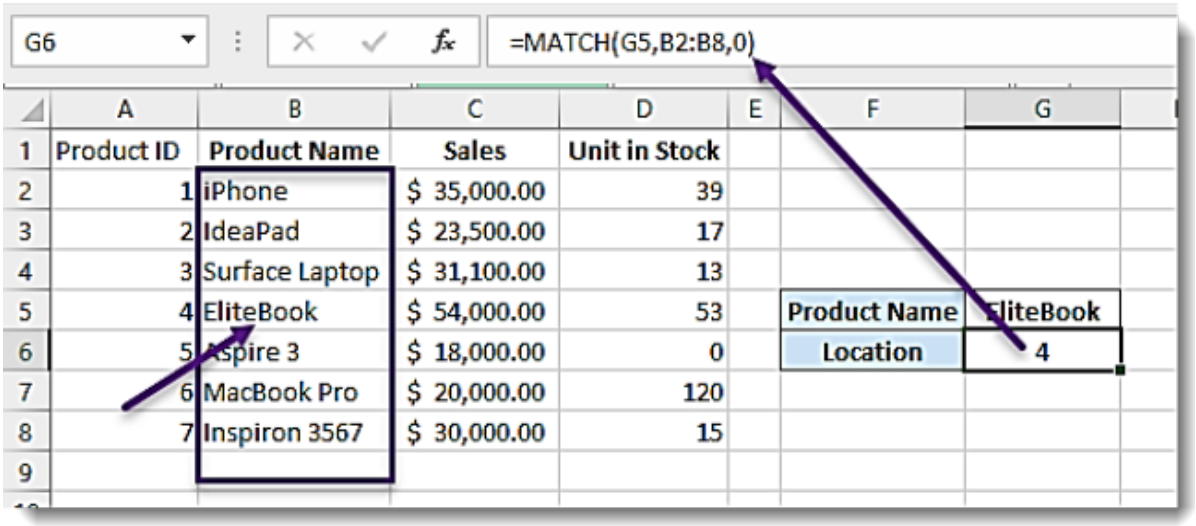
MATCH(lookup_value,lookup_array,[match_type])

To use the MATCH function, you will need to input the **lookup_value**, the range of cells to be searched by the Lookup_value, and the match type which is optional.

The value you want to find is referred to as the **lookup_value**. The lookup_array defines the range of cells that will be searched.

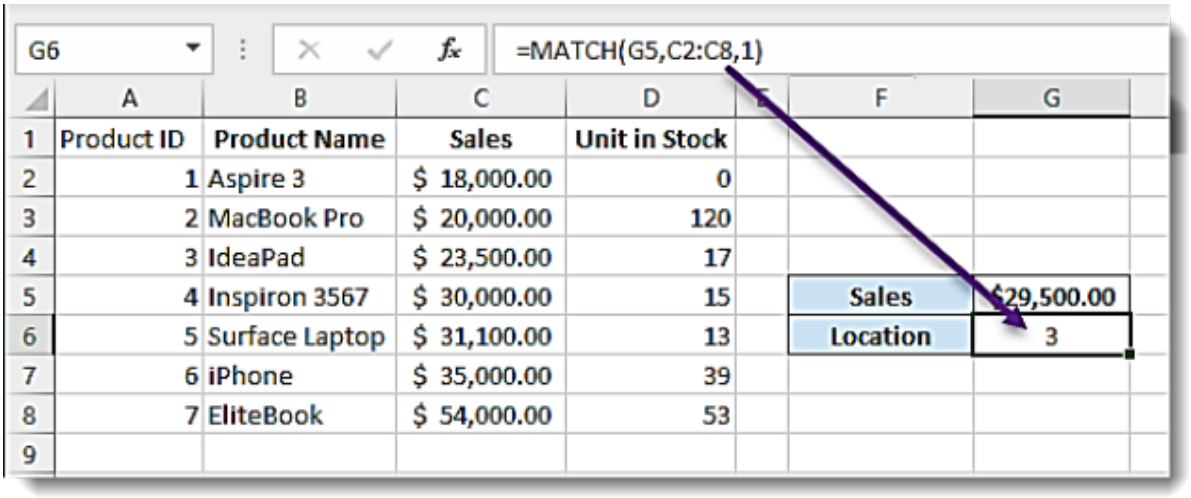
The **match type** is an option that informs Excel to decide whether it should settle for a close approximation if the desired lookup value is not found in the specified lookup range. It can be specified as **1** for an exact match, **0** for a similar match, or **-1** for an exact match in descending order (the default is set to **1**).

For example, if you wanted to identify the location of the word "**EliteBook**" in the cell range **A2** to **D8** below:



As you can see, the value in cell **G5** is located on the 4th row within the cell range **B2:B8.**

When the third argument is set to 0, the MATCH function searches for an exact match. To look for an approximate value, you will need to first sort your data in ascending order then set the third argument to **1.**



With the data **sorted** in ascending order, the MATCH function searches for the position of the value in cell **G5,** by using the largest value (**$30,000**) that is less than or equal to the lookup value.

INDEX-MATCH-MATCH FUNCTION

The INDEX-MATCH-MATCH function combines three Excel functions: INDEX, MATCH, and MATCH. INDEX function retrieves a value from a given range or array, MATCH function finds the position of a value within that range or array, and the third MATCH function enables the INDEX and MATCH functions to work together in a lookup formula to extract multiple values from an array.

The INCEX-MATCH-MATCH syntax is as follows:

INDEX (array**,MATCH(**lookup_value,lookup_array,0**) , MATCH (**lookup_value, lookup_array,0**))**

The INDEX-MATCH-MATCH function involves three steps:

- First, specifying the lookup_value, which can be a single value or a range, to be searched in the lookup array;
- Second, defining the lookup array as the range or array where the lookup_value will be searched; and
- Third, defining the match type, a setting that determines if Excel should return a close match if the lookup_value is not found in the lookup array.

Once the above steps stated are complete , the INDEX-MATCH-MATCH function will give you the location of the "lookup_value" within the "lookup_array."

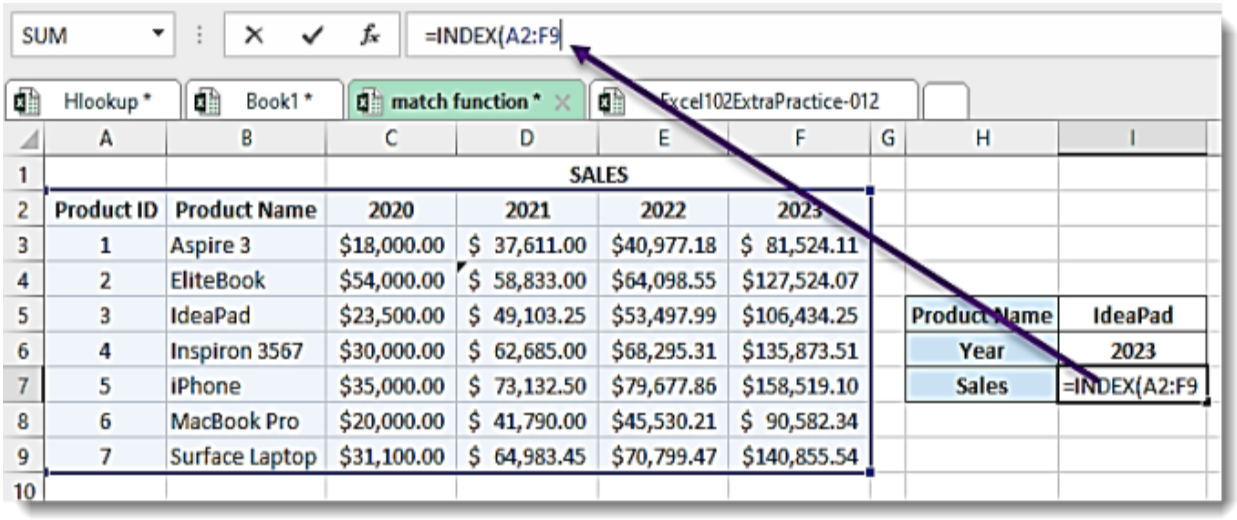
For example, if the product called " **IdeaPad**" is the "lookup_value" and the "lookup_array" is from cell **B2** to **B9** as illustrated below.

	A	B	C	D	E	F
1			SALES			
2	Product ID	Product Name	2020	2021	2022	2023
3	1	Aspire 3	$18,000.00	$ 37,611.00	$40,977.18	$ 81,524.11
4	2	EliteBook	$54,000.00	$ 58,833.00	$64,098.55	$127,524.07
5	3	IdeaPad	$23,500.00	$ 49,103.25	$53,497.99	$106,434.25
6	4	Inspiron 3567	$30,000.00	$ 62,685.00	$68,295.31	$135,873.51
7	5	iPhone	$35,000.00	$ 73,132.50	$79,677.86	$158,519.10
8	6	MacBook Pro	$20,000.00	$ 41,790.00	$45,530.21	$ 90,582.34
9	7	Surface Laptop	$31,100.00	$ 64,983.45	$70,799.47	$140,855.54

The match type in the formula is set to 0, meaning that Excel only considers an exact match. As a result, the INDEX-MATCH-MATCH function will return the position of "**IdeaPad**" in the cell range of **B2** to **B9**.

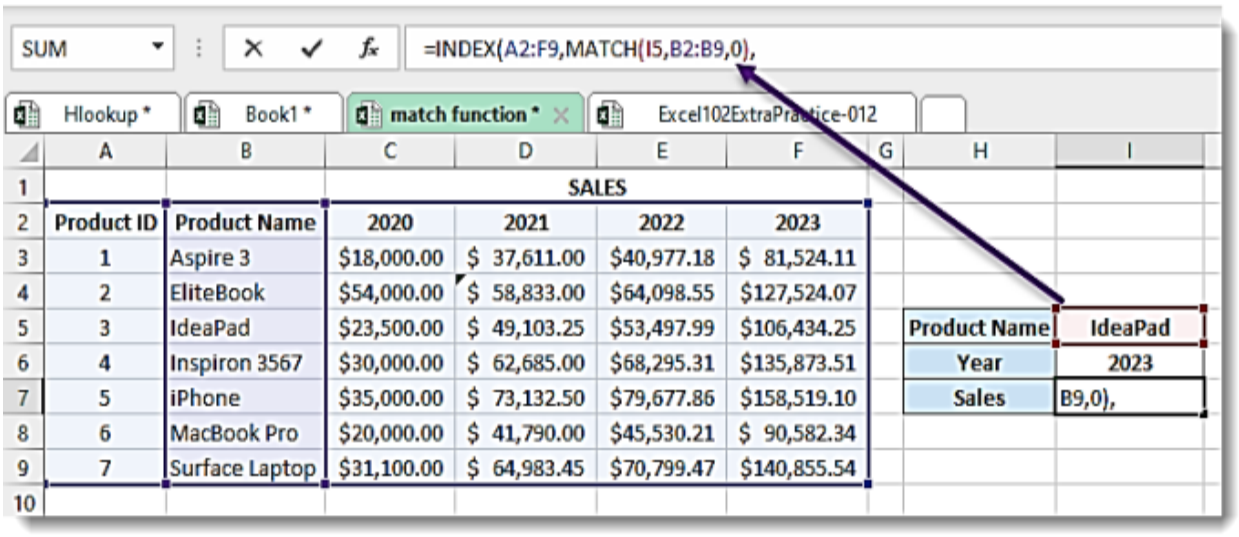
You start by entering the INDEX formula and capturing the entire table as the array, as stated below.

=INDEX (**A2:F9,**

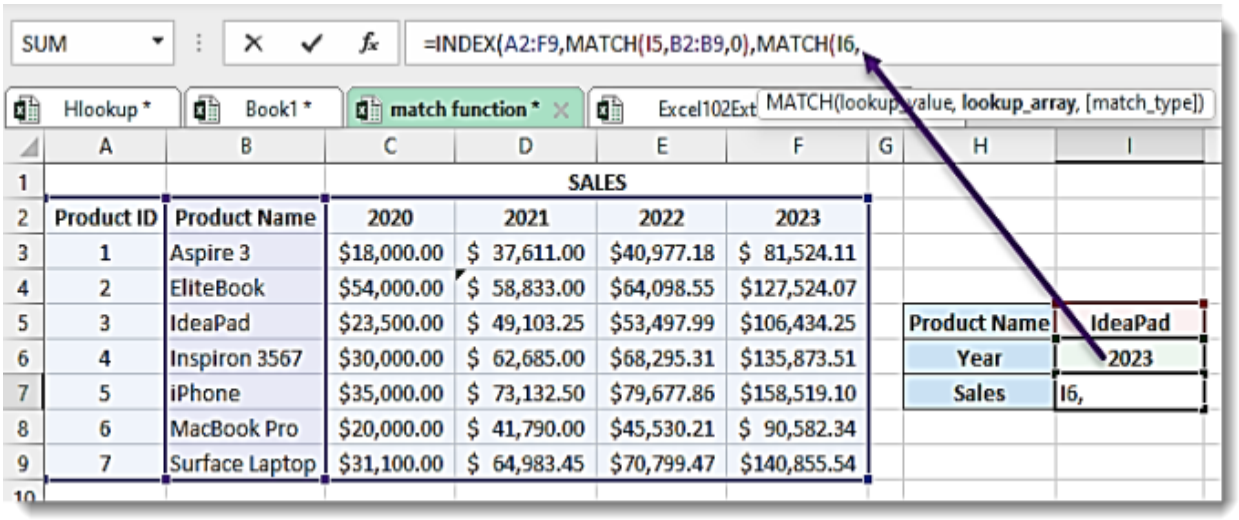


Next, you enter the Match formula, which includes a vertical lookup value cell **I5** for the lookup value input and the lookup-array cell **B2** to **B9** as illustrated below.

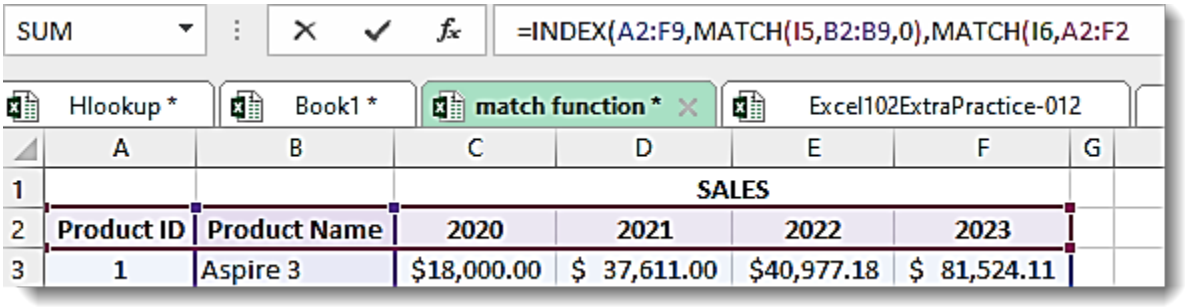
The first Match type is set to 0 in this case to perform an exact match. After which you close the Match is closed using parenthesis.



For the final MATCH function, the lookup-value is along the horizontal, which will require a value along row 2 (header). In this case, the dashboard will be used to refer to cell **I6** for the lookup-value**.**



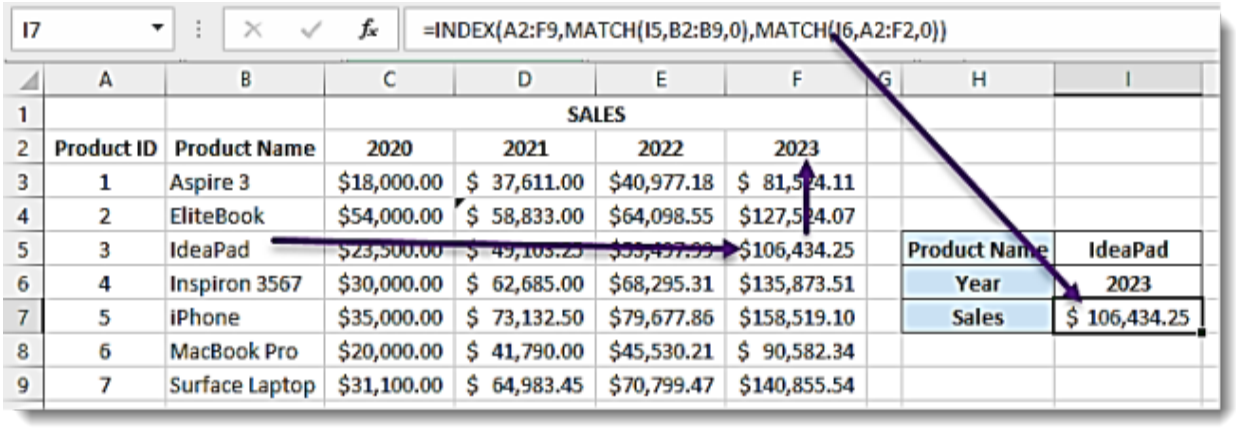
Next, you select the lookup-array using the entire header, cell range **A2:F2.**



Next, enter 0 for an exact match and close up the second MATCH function.

When done, you will need to close any opened parenthesis using the formula below

=INDEX (A1:F9,MATCH(I5,B3:B9,0),MATCH(I6,A2:F2,0))



The INDEX formula in Excel requires calculating results from two MATCH formulas. As you can see from the table, the "**IdeaPad**" is the 5th item in the left column and "2023" is the 6th value along the headers in the top row, these formulas become 5 and 6, respectively. After simplifying these components, Excel performs an INDEX lookup that goes 5 rows down and 6 columns to the right to retrieve the value "**$106,424.25**".

XLOOKUP FUNCTION (EXCEL 365)

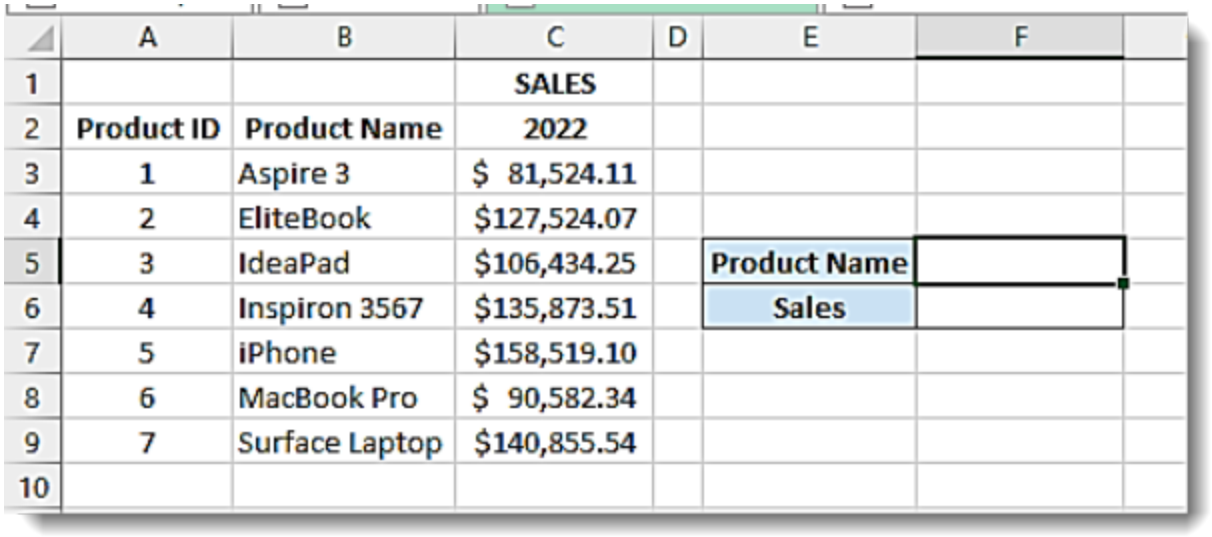
XLOOKUP function is a feature in Excel that allows you to streamline the process of searching for values across multiple columns and rows. This function is so flexible that you can search for values in various data structures, including tables, arrays, and entire sheets. It allows you to search across different columns and rows and returns the result from the same table. You can replace it with the previously utilized VLOOKUP, HLOOKUP, and INDEX/MATCH functions employed for more intricate lookups.

XLOOKUP function goes beyond using it for simple lookups. It can also handle advanced tasks like searching for multiple values in a table, carrying out calculations based on lookup results, searching for values from multiple rows and columns, and performing calculations based on multiple lookups. Its ease of use and ability to quickly perform lookups and calculations make it an indispensable tool for any Excel user.

The Xlookup syntax is as follows:

XLOOKUP(lookup_value,lookup_array,return_array,not_found,match_mode, search_mode)

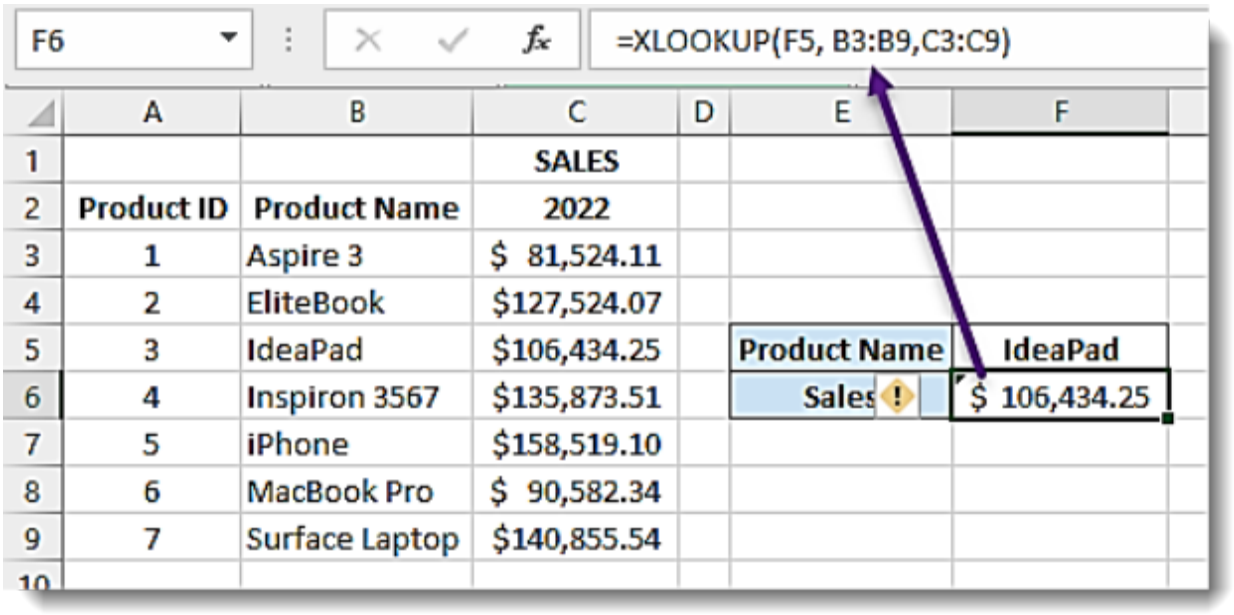
The table below summarizes information about the product sold in the year 2022.

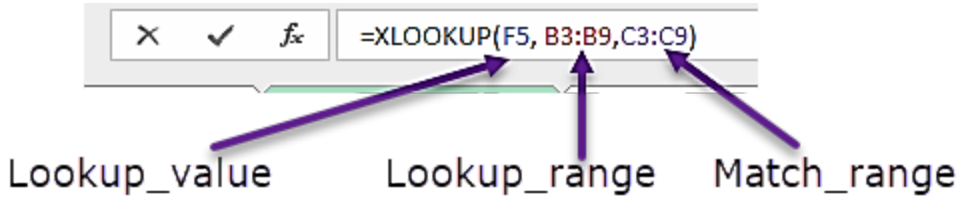


	A	B	C	D	E	F
1			SALES			
2	Product ID	Product Name	2022			
3	1	Aspire 3	$ 81,524.11			
4	2	EliteBook	$127,524.07			
5	3	IdeaPad	$106,434.25		Product Name	
6	4	Inspiron 3567	$135,873.51		Sales	
7	5	iPhone	$158,519.10			
8	6	MacBook Pro	$ 90,582.34			
9	7	Surface Laptop	$140,855.54			
10						

To find the **Sales** made for a particular **Product** entered in cell **F5** (lookup_value), use the formula with Product Name in cell range **B3:B9**(lookup_array) and Sales year in **C3:C9** (return_array) as follows:

=XLOOKUP(**F5**, **B3:B9**,**C3:C9**)





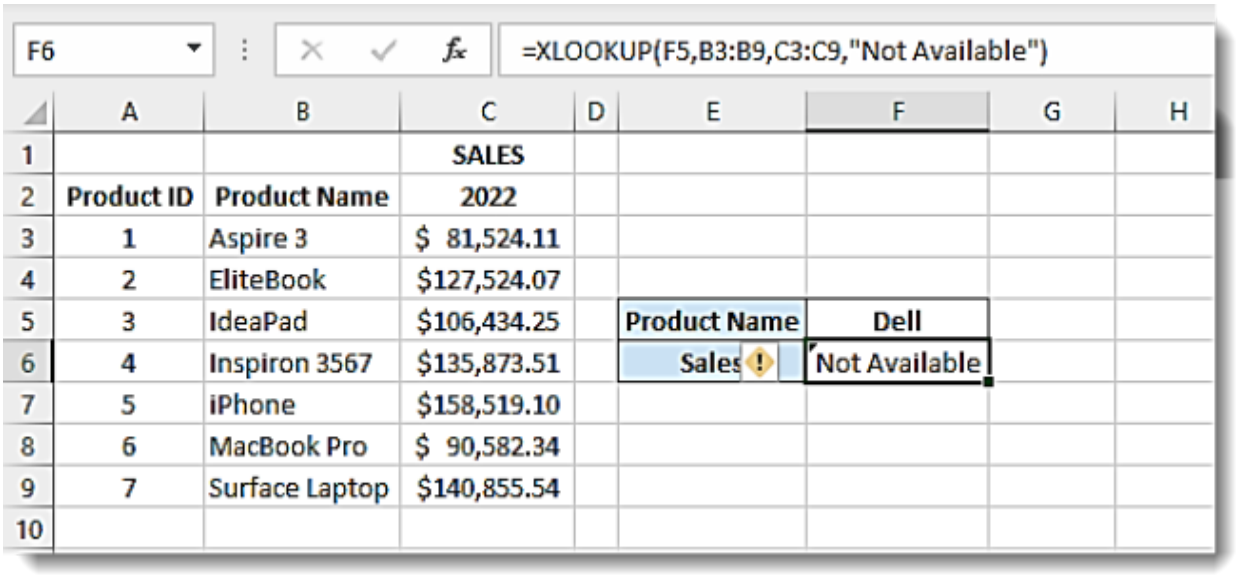
In simple terms, the formula means to find the **F5** value in the range **B3** to **B9**, and return a corresponding value from the range **C3** to **C9** in the same row.

No need to use column numbers, sorting, or any other confusing features of the Vlookup function; it just works straightforwardly.

A text value can also be returned if the lookup value is not found instead of showing an error message.

The formula will then be written as:

=XLOOKUP(F5,B3:B9,C3:C9,"Not Available")



	A	B	C	D	E	F	G	H
1			SALES					
2	Product ID	Product Name	2022					
3	1	Aspire 3	$ 81,524.11					
4	2	EliteBook	$127,524.07					
5	3	IdeaPad	$106,434.25		Product Name	Dell		
6	4	Inspiron 3567	$135,873.51		Sales	Not Available		
7	5	iPhone	$158,519.10					
8	6	MacBook Pro	$ 90,582.34					
9	7	Surface Laptop	$140,855.54					
10								

DATE AND TIME FUNCTIONS

Excel is a highly effective tool for managing date and time information. It offers numerous date and time functions that can be used to perform calculations, conversions, and manipulations. These functions enable you to accomplish tasks such as determining the day of the week for a given date, formatting dates and times in various ways, and calculating the period between two dates.

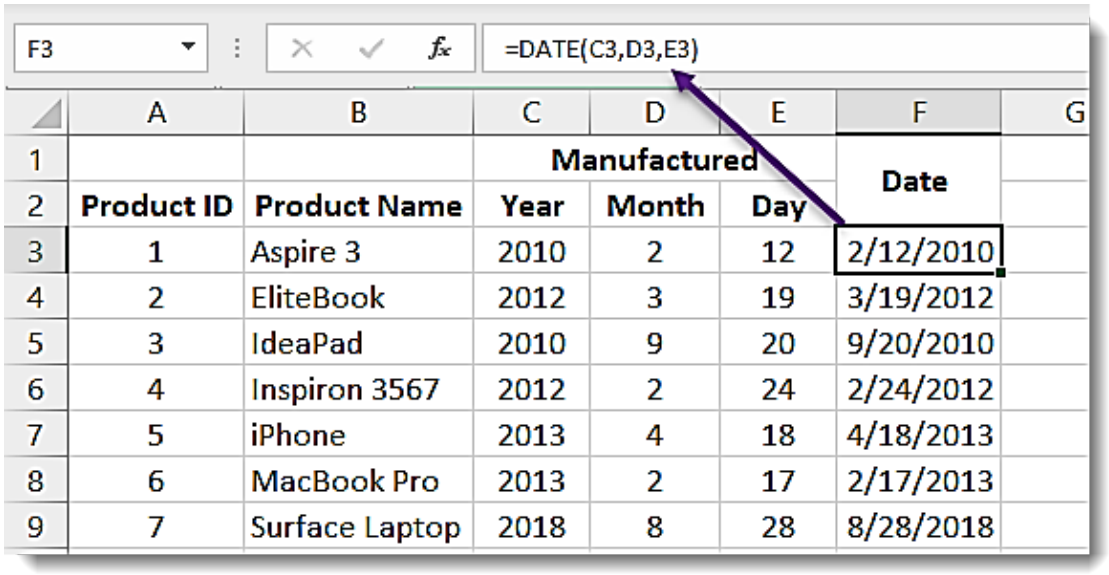
DATE FUNCTION

You can use the DATE function in Excel to simplify the process of updating a calendar. This function eliminates the need to adjust a calendar in a worksheet manually. The DATE function is widely used in Excel for date and time operations. The function allows you to create a date value by specifying the year, month, and day to automate calendar updates.

The DATE function syntax is as follows:

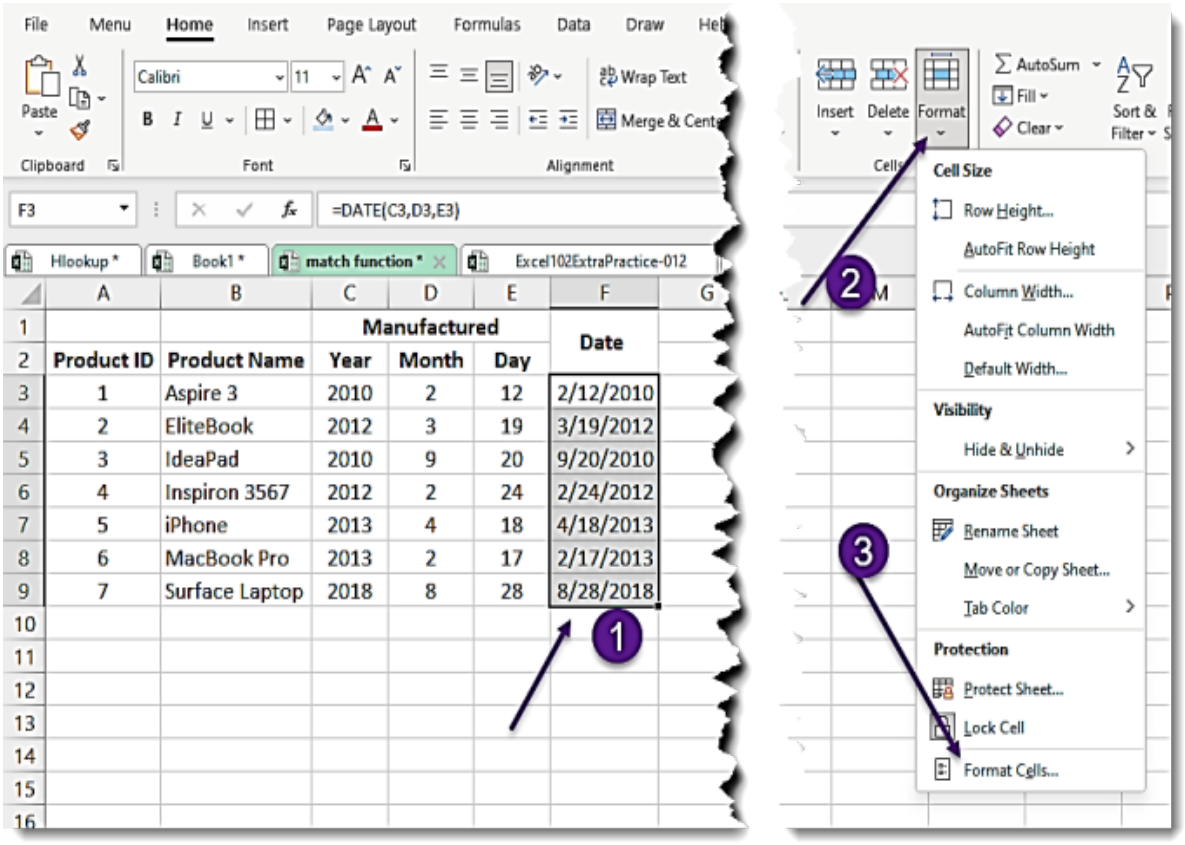
=DATE(Year,Month,Day)

For example, the table below shows data from a registration process.

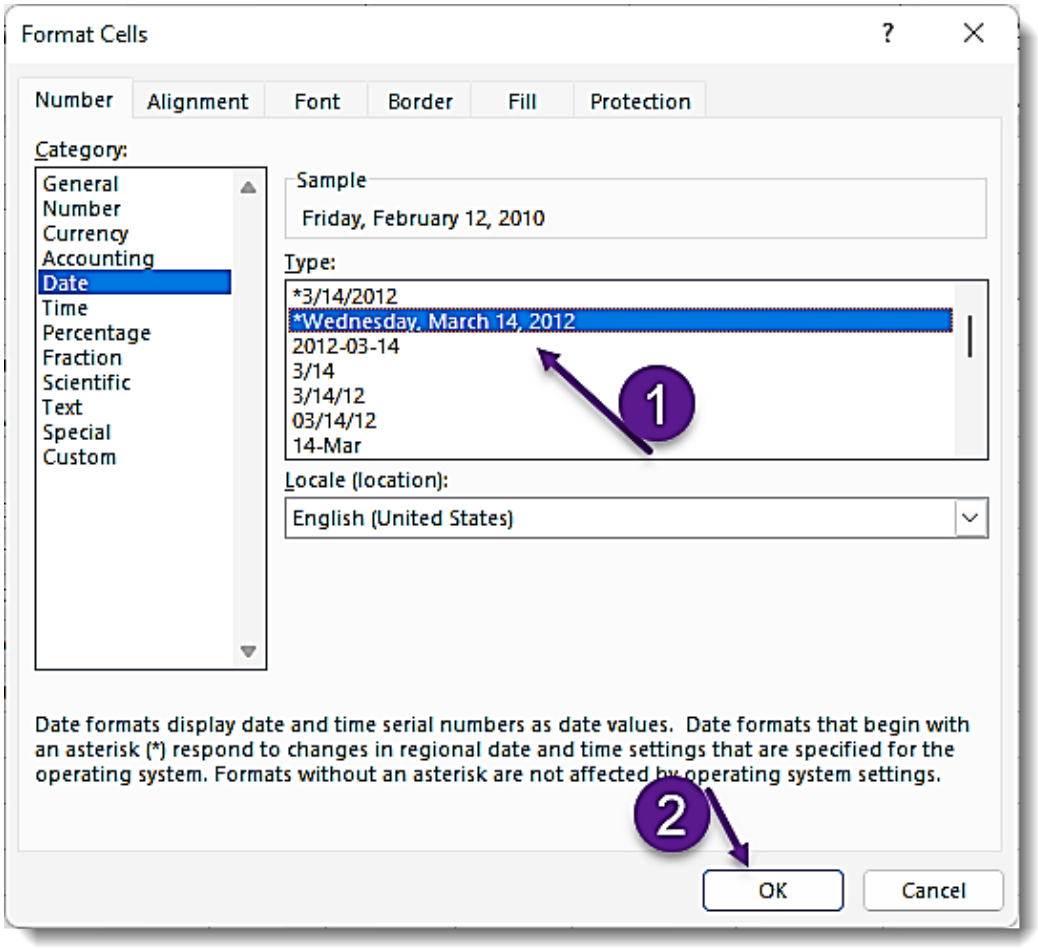


	A	B	C	D	E	F	G
1			Manufactured			Date	
2	Product ID	Product Name	Year	Month	Day		
3	1	Aspire 3	2010	2	12	2/12/2010	
4	2	EliteBook	2012	3	19	3/19/2012	
5	3	IdeaPad	2010	9	20	9/20/2010	
6	4	Inspiron 3567	2012	2	24	2/24/2012	
7	5	iPhone	2013	4	18	4/18/2013	
8	6	MacBook Pro	2013	2	17	2/17/2013	
9	7	Surface Laptop	2018	8	28	8/28/2018	

To change the cell format of the Date, select the cell range, and on the **Home** tab click on the **Format button**, then move down and click on **Format Cells**.


File
Menu
Home
Insert
Page Layout
Formulas
Data
Draw
Paste
Calibri
11
Wrap Text
Merge & Cente
Clipboard
Font
Alignment
F3
=DATE(C3,D3,E3)
Hlookup *
Book1 *
match function *
Excel102ExtraPractice-012
Manufactured
Date
Product ID
Product Name
Year
Month
Day
1 Aspire 3 2010 2 12 2/12/2010
2 EliteBook 2012 3 19 3/19/2012
3 IdeaPad 2010 9 20 9/20/2010
4 Inspiron 3567 2012 2 24 2/24/2012
5 iPhone 2013 4 18 4/18/2013
6 MacBook Pro 2013 2 17 2/17/2013
7 Surface Laptop 2018 8 28 8/28/2018
1
Insert
Delete
Format
AutoSum
Fill
Clear
Sort &
Filter
Cells
2
3
Cell Size
Row Height...
AutoFit Row Height
Column Width...
AutoFit Column Width
Default Width...
Visibility
Hide & Unhide
Organize Sheets
Rename Sheet
Move or Copy Sheet...
Tab Color
Protection
Protect Sheet...
Lock Cell
Format Cells...

In the **Format cell** dialog box, select any of the Date format in the **Type** section and click on the **OK** button to effect the changes.



	A	B	C	D	E	F
1			Manufactured			Date
2	Product ID	Product Name	Year	Month	Day	
3	1	Aspire 3	2010	2	12	Friday, February 12, 2010
4	2	EliteBook	2012	3	19	Monday, March 19, 2012
5	3	IdeaPad	2010	9	20	Monday, September 20, 2010
6	4	Inspiron 3567	2012	2	24	Friday, February 24, 2012
7	5	iPhone	2013	4	18	Thursday, April 18, 2013
8	6	MacBook Pro	2013	2	17	Sunday, February 17, 2013
9	7	Surface Laptop	2018	8	28	Tuesday, August 28, 2018

However, any format you choose to use should be much more presentable.

TIME FUNCTION

You can use the TIME function to create a time value from the hour, minute, and second values, just like you can do the same with the DATE function by obtaining these values from cells.

The TIME Function syntax is as follows;

=TIME(hour,minute,second)

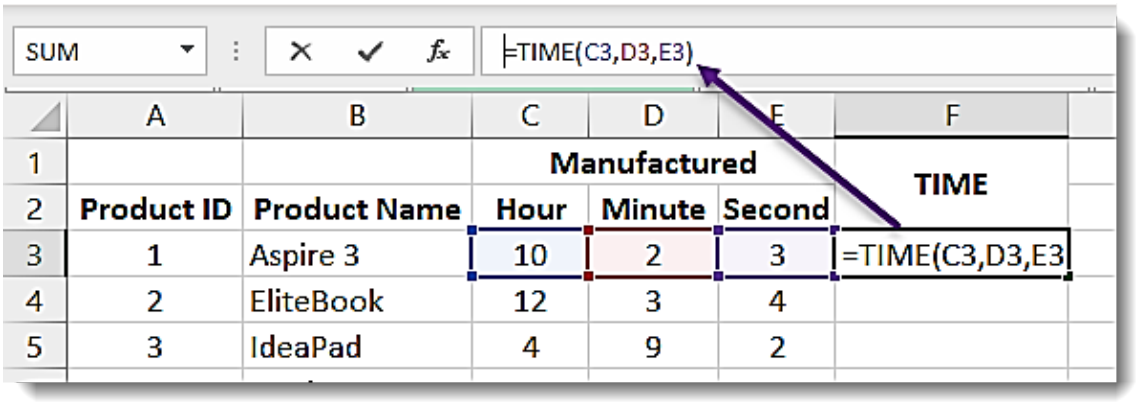
You can capture the values using the TIME function if you have data extracted from another file format.

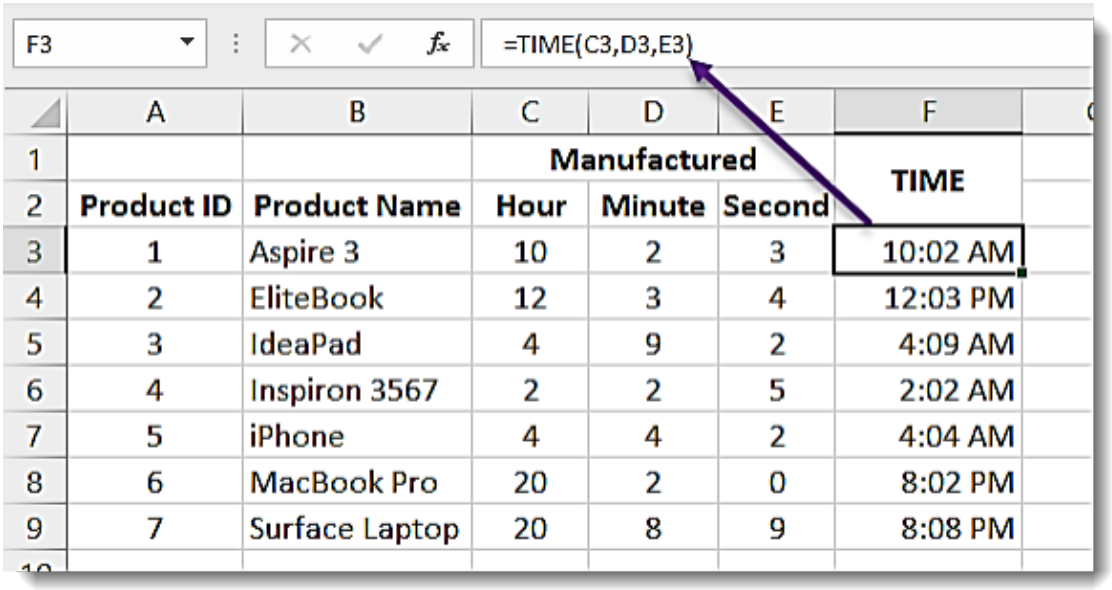
	A	B	C	D	E	F
1			Manufactured			TIME
2	Product ID	Product Name	Hour	Minute	Second	
3	1	Aspire 3	10	2	3	
4	2	EliteBook	12	3	4	
5	3	IdeaPad	4	9	2	
6	4	Inspiron 3567	2	2	5	
7	5	iPhone	4	4	2	
8	6	MacBook Pro	20	2	0	
9	7	Surface Laptop	20	8	9	
10						

To insert the time into the cells in column **F**, you utilize the TIME function with the formula

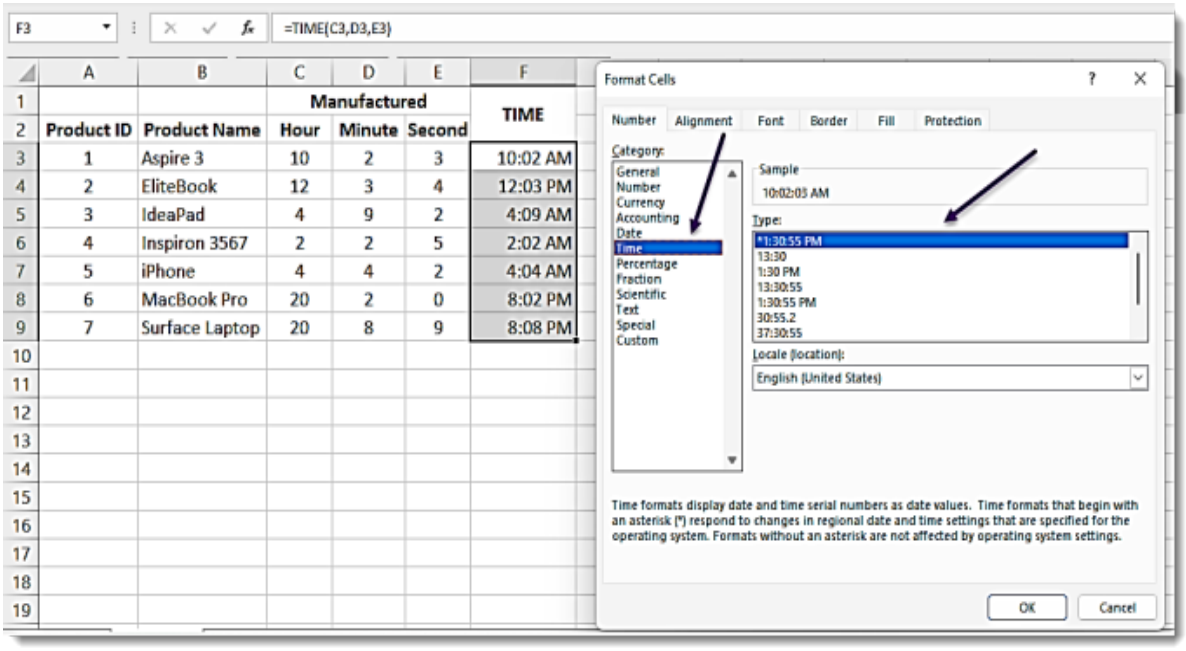
=TIME(C3,D3,E3)

Where **C3**, **D3**, and **E3** represent the hour, minutes, and seconds respectively.





If your result does not reflect what you expected, select the cell range and use the **Format Cells** dialog box to fix it.



	A	B	C	D	E	F
1			Manufactured			TIME
2	Product ID	Product Name	Hour	Minute	Second	
3	1	Aspire 3	10	2	3	10:02 AM
4	2	EliteBook	12	3	4	12:03 PM
5	3	IdeaPad	4	9	2	4:09 AM
6	4	Inspiron 3567	2	2	5	2:02 AM
7	5	iPhone	4	4	2	4:04 AM
8	6	MacBook Pro	20	2	0	8:02 PM
9	7	Surface Laptop	20	8	9	8:08 PM

All your values when using the TIME Function must be numeric; else the formula will return a #VALUE error.

NOW FUNCTION

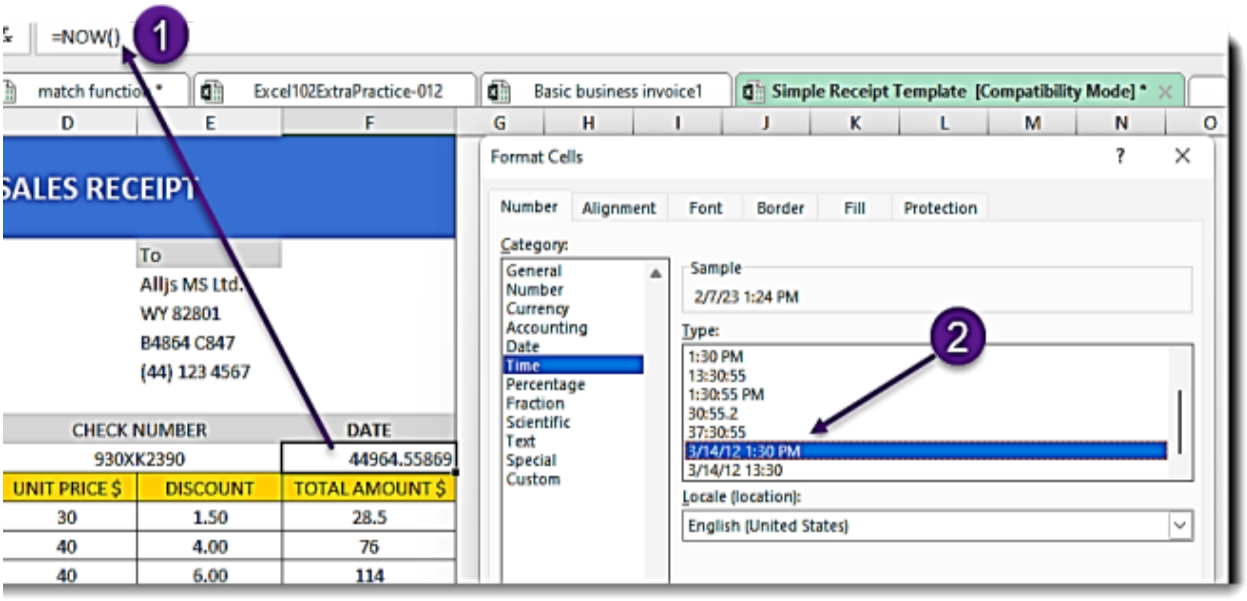
The NOW function dynamically displays the current system date and time. This Function allows you to return the current date and time without manually entering it. It also updates itself automatically whenever you carry out any modifications on the worksheet. For example, any changes you make to values will cause the NOW Function to refresh. If you need to update the worksheet manually, press F9 to recalculate the value.

The NOW Function syntax is:

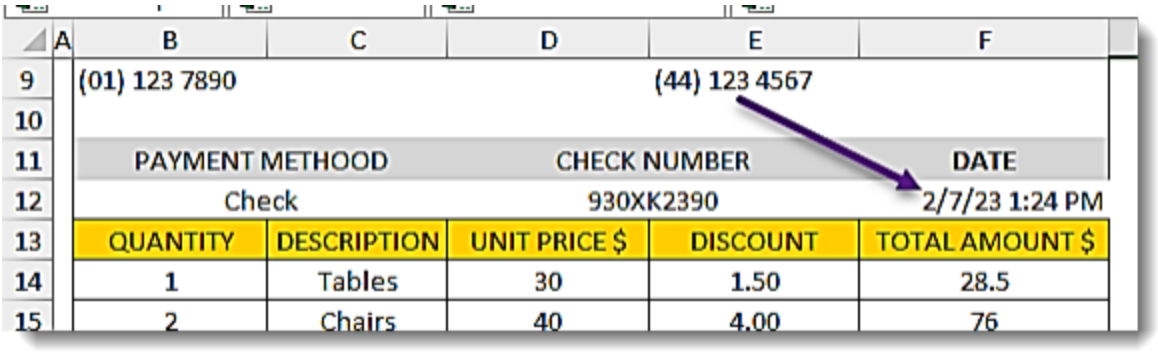
=NOW()

The NOW function doesn't require an argument because the parenthesis is empty.

Suppose you have a **Sales Recept** and want to show the time when the payment was made or printed. As illustrated below, a section of the receipt cell **F12** returns the current time.



In the Format Cells dialog box, the type of Time format chosen returns the current date and time. Below is the result.



	A	B	C	D	E	F
9		(01) 123 7890			(44) 123 4567	
10						
11		PAYMENT METHOOD		CHECK NUMBER		DATE
12		Check		930XK2390		2/7/23 1:24 PM
13		QUANTITY	DESCRIPTION	UNIT PRICE $	DISCOUNT	TOTAL AMOUNT $
14		1	Tables	30	1.50	28.5
15		2	Chairs	40	4.00	76

DAY FUNCTION

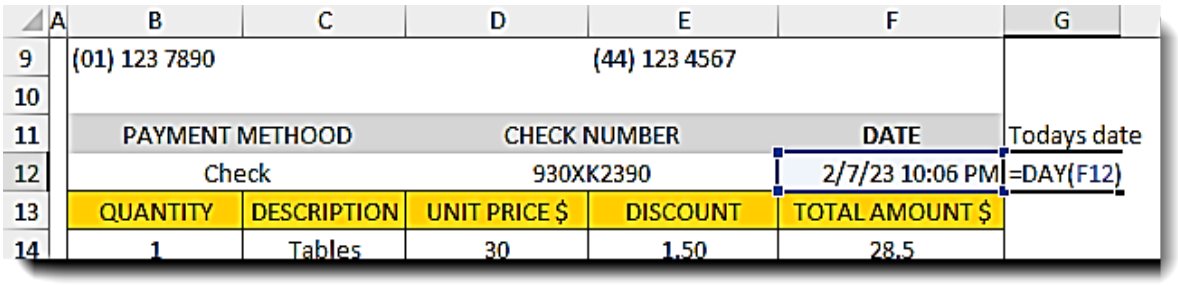
The DAY function in Excel allows you to determine the day of the month from a given date. It requires a date as an argument and returns a number (between 1-31) representing the day.

The DAY function syntax is:

=DAY(Serial_number).

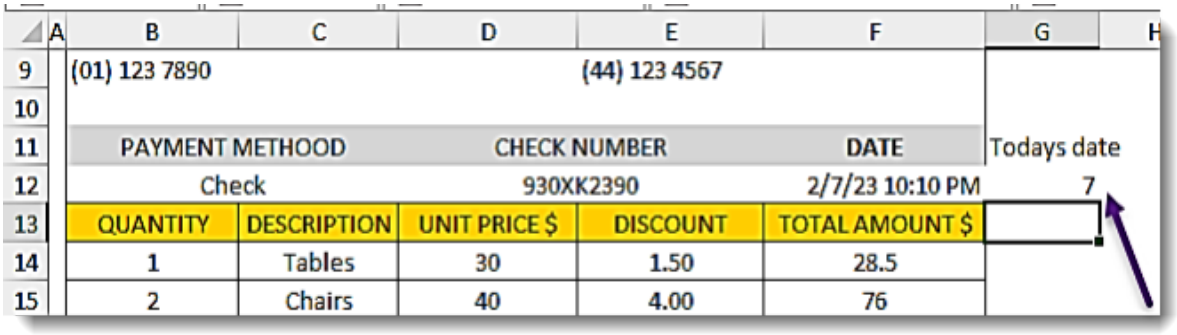
The only argument required is a valid date in the worksheet.

Suppose you have a date in cell **F12** as illustrated below:



	A	B	C	D	E	F	G
9		(01) 123 7890			(44) 123 4567		
10							
11		PAYMENT METHOOD		CHECK NUMBER		DATE	Todays date
12		Check		930XK2390		2/7/23 10:06 PM	=DAY(F12)
13		QUANTITY	DESCRIPTION	UNIT PRICE $	DISCOUNT	TOTAL AMOUNT $	
14		1	Tables	30	1.50	28.5	

If the need arises for you to extract the day into another cell, you can achieve this by using the DAY function, which in this case, returns the value **7** in cell **G12**.



	A	B	C	D	E	F	G	H
9		(01) 123 7890			(44) 123 4567			
10								
11		PAYMENT METHOOD		CHECK NUMBER		DATE	Todays date	
12		Check		930XK2390		2/7/23 10:10 PM	7	
13		QUANTITY	DESCRIPTION	UNIT PRICE $	DISCOUNT	TOTAL AMOUNT $		
14		1	Tables	30	1.50	28.5		
15		2	Chairs	40	4.00	76		

WEEKDAY FUNCTION

The WEEKDAY function allows you to determine the day of the week using a given date, provided as an argument.

The WEEKDAY Function syntax is:

=WEEKDAY(serial_number, [return_type])

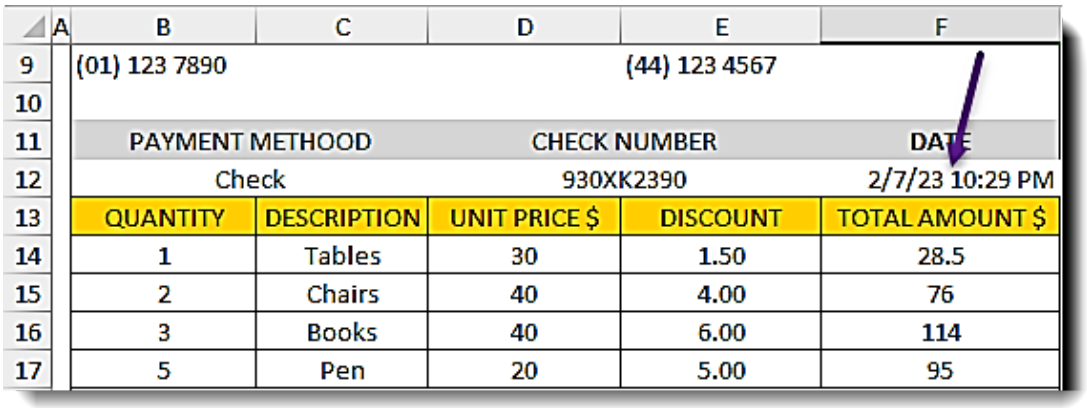
The **serial_number** is a digit indicating the day from which you desire to determine the weekday.

The **return_type** is optional, but it is a value used to determine the type of value to be returned.

By default, you use the **return_type** to indicate the first day of the week. If you ignore adding it to the formula, Excel will use the first day as Sunday to be 1 and Saturday as 7.

The value returned is always an integer, which ranges from 0 to 7, with 1 representing the starting day specified by you.

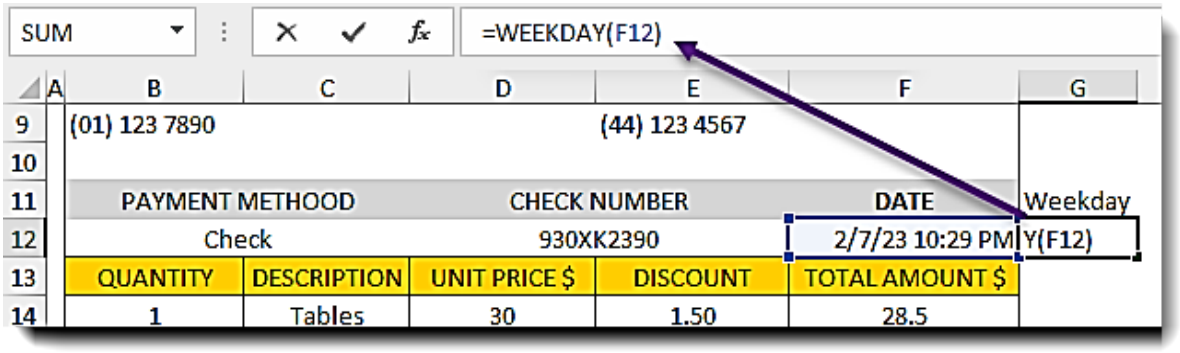
For example, to determine the weekday in cell **F12** as illustrated below:



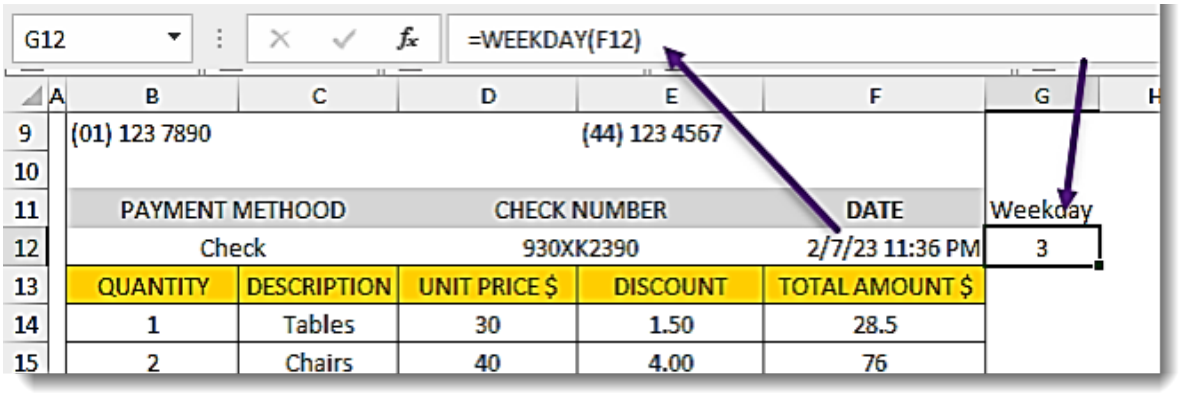
	A	B	C	D	E	F
9		(01) 123 7890			(44) 123 4567	
10						
11		PAYMENT METHOOD		CHECK NUMBER		DATE
12		Check		930XK2390		2/7/23 10:29 PM
13		QUANTITY	DESCRIPTION	UNIT PRICE $	DISCOUNT	TOTAL AMOUNT $
14		1	Tables	30	1.50	28.5
15		2	Chairs	40	4.00	76
16		3	Books	40	6.00	114
17		5	Pen	20	5.00	95

The formula entered in cell **G12** is:

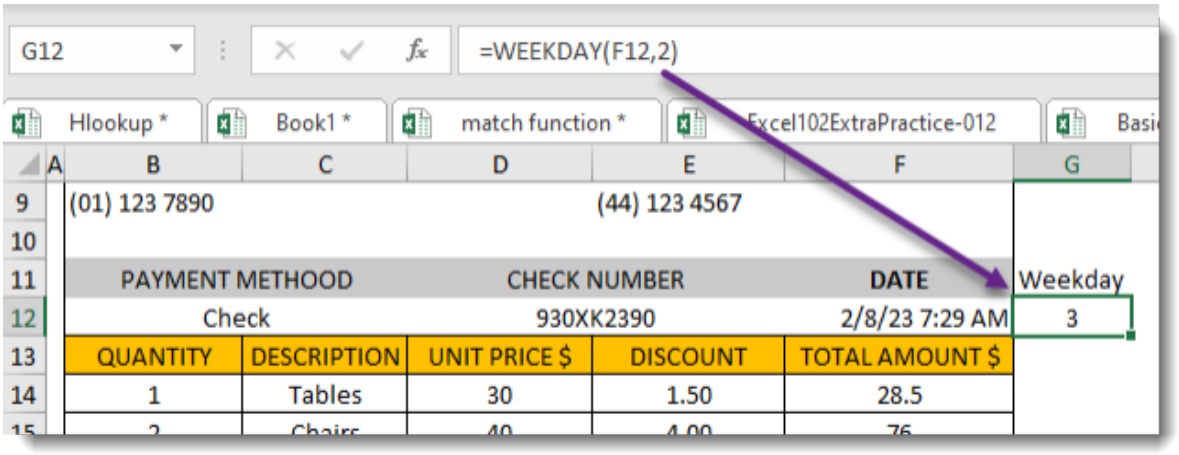
=WEEKEND(F12)



Note that the Return_type was omitted in the formula, so Excel will take 1 to represent Sunday. The result is 3, which means Tuesday.



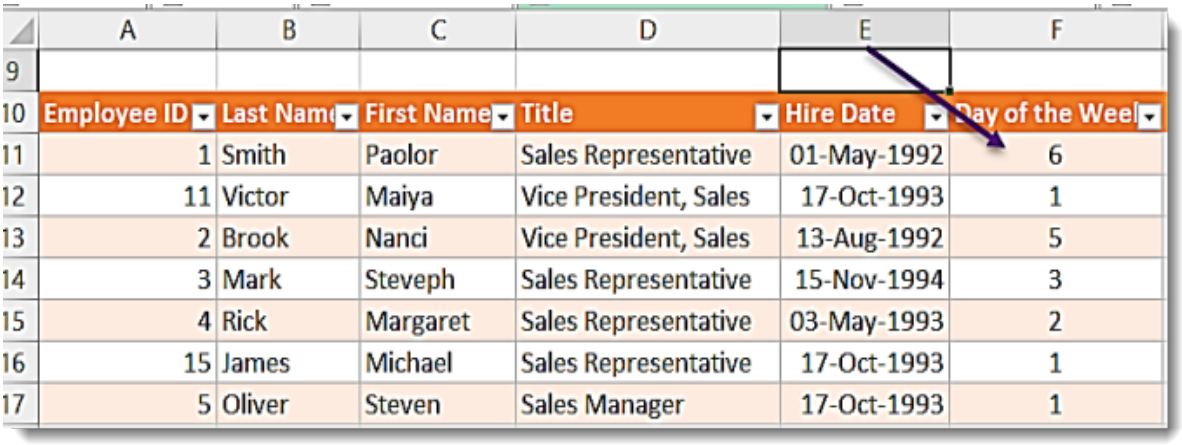
The date 2/3/23, which was a Wednesday, the **return_type** entered was 2.



The result gotten was 3, which means the result falls within 1-7: Monday returns as 1, Wednesday is 3, and Sunday will be 7.

If the return_type is 2, the result will fall within 1-7, making Monday 1 and Sunday 7.

The application of the **WEEKDAY** Function in an Employee List is as illustrated below.



	A	B	C	D	E	F
9						
10	Employee ID	Last Nam	First Name	Title	Hire Date	Day of the Wee
11	1	Smith	Paolor	Sales Representative	01-May-1992	6
12	11	Victor	Maiya	Vice President, Sales	17-Oct-1993	1
13	2	Brook	Nanci	Vice President, Sales	13-Aug-1992	5
14	3	Mark	Steveph	Sales Representative	15-Nov-1994	3
15	4	Rick	Margaret	Sales Representative	03-May-1993	2
16	15	James	Michael	Sales Representative	17-Oct-1993	1
17	5	Oliver	Steven	Sales Manager	17-Oct-1993	1

EDATE FUNCTION

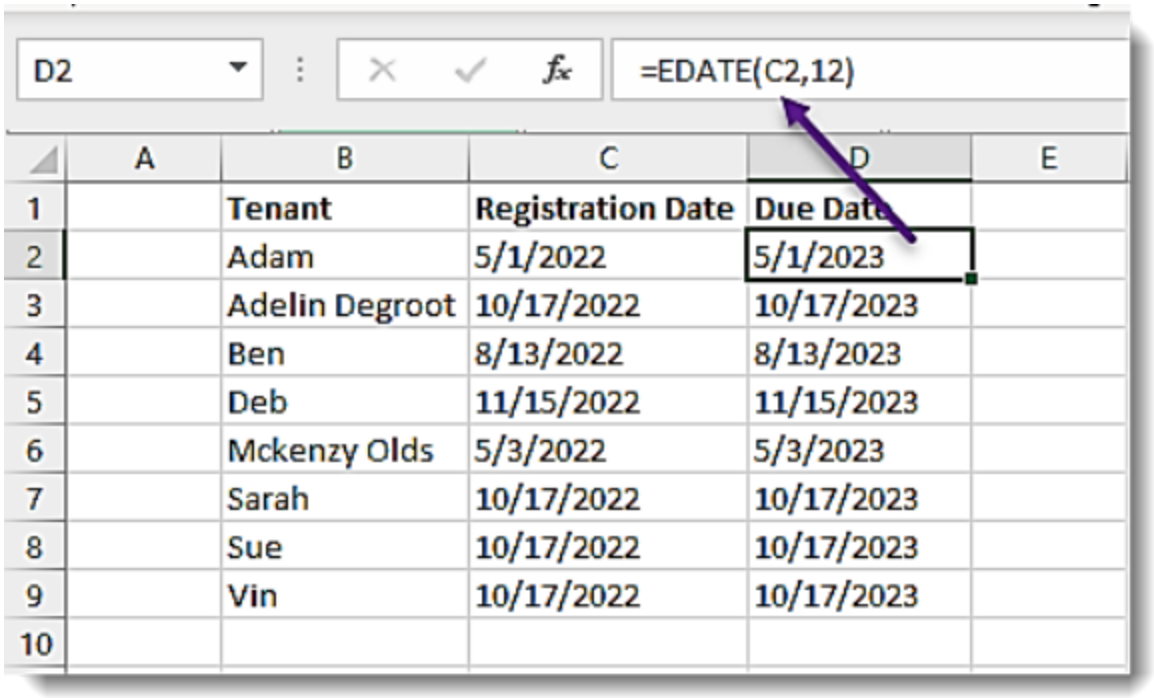
The EDATE function allows you to increase or decrease the amount of a targeted number of months from a specific date.

The EDATE Function syntax is as follows:

=EDATE(start_date, months)

The EDATE function takes two arguments: the **start_date**, which is a date, and the number of **months** to add to the start date, which is an integer. The result it returns is also a date.

For example, in the illustration below, cell **C2** has the date when the tenant paid his rent.



	A	B	C	D	E
1		Tenant	Registration Date	Due Date	
2		Adam	5/1/2022	5/1/2023	
3		Adelin Degroot	10/17/2022	10/17/2023	
4		Ben	8/13/2022	8/13/2023	
5		Deb	11/15/2022	11/15/2023	
6		Mckenzy Olds	5/3/2022	5/3/2023	
7		Sarah	10/17/2022	10/17/2023	
8		Sue	10/17/2022	10/17/2023	
9		Vin	10/17/2022	10/17/2023	
10					

The due date for the next payment is in 12 months, so cell **D2** is used to return the data automatically using the EDATE function as follows:

=EDATE(C2,12)

You are to add 12 months to the registration date to return a new date 12 months from the date in cell **C2.**

Similarly, you can subtract a number of months from the date by using a negative number. For example, to subtract 6 months from the date in cell **C2**, you used the formula:

=EDATE(C2,**-6**)

FINANCIAL FUNCTIONS

Excel offers a vast collection of financial functions you can access. Some are ideal for personal finance, while others cater to the commerce and industry sectors. At the same time, some of these functions can be utilized for both purposes. Becoming proficient in using these financial functions may require some practice.

PMT FUNCTION

The PMT Function, also called the **Payment** Function, is a financial function used in Excel to carry out calculations on loan or investment payments continuously implemented with a fixed interest rate.

The PMT Function syntax is as follows:

PMT(rate,nper,pv,[fv],[type])

The following are the PMT Function arguments:

- **Rate** – this argument *is required* to determine the *interest rate of the specific loan.*
- **Nper** – this argument *is required* to determine the *cumulated number of payments for the acquired loan.*
- **PV** – this argument *is required* to determine the *current value* or *principal of the acquired loan.*
- **FV** – this argument *is optional but used* to determine the *future value of the acquired loan* OR *the cash balance you want to achieve after all the outstanding amount* is paid.

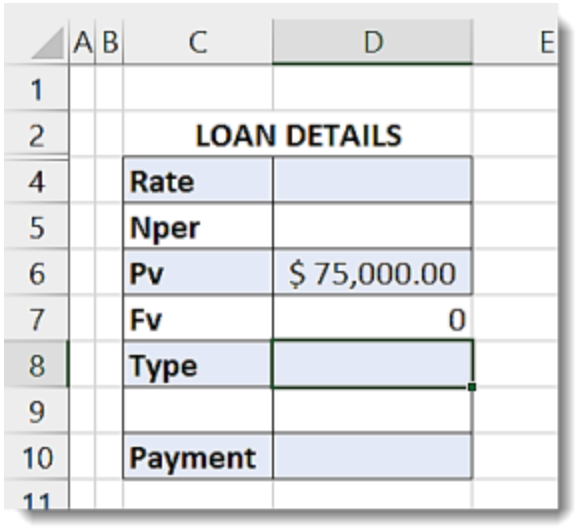
If you omit this argument, Excel will assume the FV value to be 0, meaning you intend to pay for the loan ultimately, so the Future value of the acquired loan equals 0.

- **Type** – this argument is optional but used to specify when the payments will be due. If omitted, Excel will assume the Type value to be zero. If the Type value is 1, it means you will be making payments at the

beginning of the period, and if the Type value is zero, you will make payments at the end of the period.

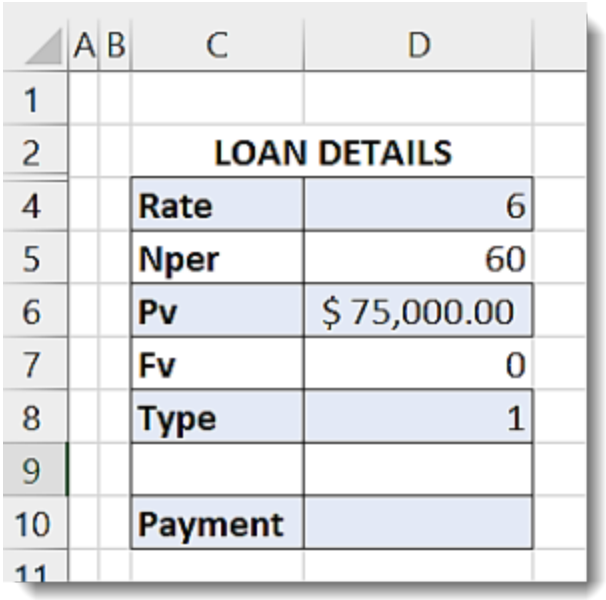
Paying at the beginning of the period means you won't need to pay any interest, while if you wait until the end, interest will accumulate on the outstanding balance.

For example, if you want to borrow $75,000 and decide that you will pay that loan off. So you will have the **PV** equal to $75,000 and the **Fv** to be 0 as illustrated below.



	A	B	C	D	E
1					
2			LOAN DETAILS		
4			Rate		
5			Nper		
6			Pv	$ 75,000.00	
7			Fv	0	
8			Type		
9					
10			Payment		
11					

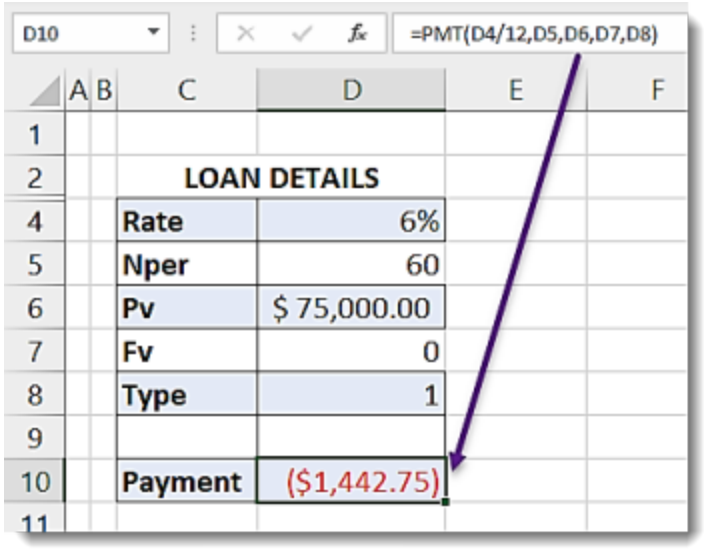
Next, the payments will be met at the start of each period, which makes the Type **1**. The payment is going to be done monthly over the course of **Five** years, which amounts to **60** payments and the rate of interest is 5% per year as illustrated below.



	C	D
1		
2	LOAN DETAILS	
4	Rate	6
5	Nper	60
6	Pv	$ 75,000.00
7	Fv	0
8	Type	1
9		
10	Payment	

Note that the rate is first converted into monthly by dividing the value in cell **D6** by 12 months. So the formula will be as follows:

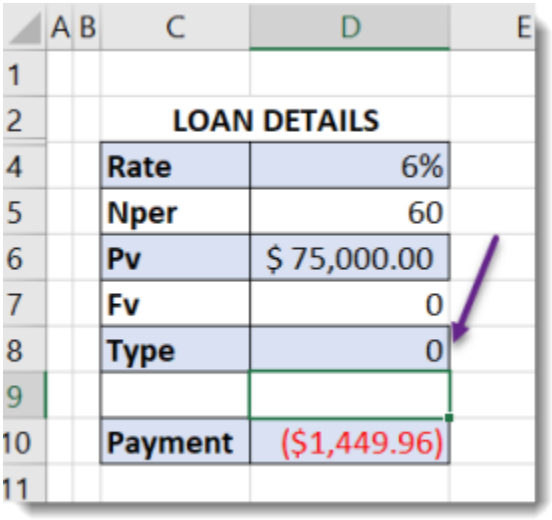
=PMT(D4/12,D5,D6,D7,D8)



	C	D	E	F
1				
2	LOAN DETAILS			
4	Rate	6%		
5	Nper	60		
6	Pv	$ 75,000.00		
7	Fv	0		
8	Type	1		
9				
10	Payment	($1,442.75)		

The result appears in red font because the money is going out from your pocket.

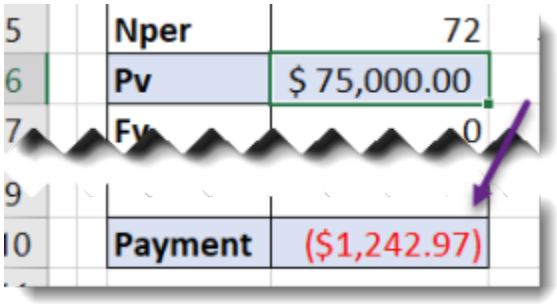
Below is what you will get if you decide to change the **Type** to **0.**



	C	D
2	**LOAN DETAILS**	
4	**Rate**	6%
5	**Nper**	60
6	**Pv**	$ 75,000.00
7	**Fv**	0
8	**Type**	0
9		
10	**Payment**	($1,449.96)

If the payment is made at the end of the month, there will be a $7.21 difference between $1,442.75 and $1,449.96, representing an increase.

Another thing you can check is the effect of increasing the number of months. So it will now be Six year, which is 72 months.



5	**Nper**	72
6	**Pv**	$ 75,000.00
7	**Fv**	0
9		
10	**Payment**	($1,242.97)

By utilizing the PMT function in Excel, it is straightforward to adjust each argument and determine the outcomes of how much is needed to pay for the

loan. For example, increasing the interest rate will also increase the amount you need to pay back.

Alternatively, by extending the repayment period, you would pay less per month but increase the amount you owe overall. Ultimately, this arrangement makes it easy to see the options available and make a better financial decision about your loan.

FV FUNCTION

With the future value (FV) function in Microsoft Excel, you can figure out how much your investment will be worth, assuming a certain rate of return. You can also use the function to figure out your investment's present value, which is in the future.

An annuity is a type of investment that guarantees a certain amount of income on a regular basis. When planning for long-term investments like retirement or college savings accounts, the FV function can be helpful in the planning process. In addition, it can be utilized to determine how much an annuity will be worth at some point in the future.

The FV function syntax is as follows:

=FV(rate, nper, pmt, [pv], [type])

The FV function requires you to enter the following arguments:

- **Rate** - this is the interest rate period
- **Nper** - this is the total number of the payment period
- **Pmt** - this is the payment made at each period and has to be a negative value.
- **Pv -** stands for Present Value and it is optional and represents the current value of the future payments. If you omit the **Pv**, Excel will assume it to be zero, else the **Pv** always has to be entered as a negative number.
- **type -** this value is optional and represents when payment is due.

The value **0** indicates when the period ends, while **1** is for the start of a period.

Note:

- When the ***pmt*** involves withdrawing money (for instance depositing to savings), the ***payment value*** should be **negative**; however, if you are receiving money (e.g. income or dividends) the payment value should be **positive**.
- To ensure that your payments on a loan with a 2-year duration and 6% annual interest rate are calculated correctly, the units for both "**rate**" and "**nper**" must be consistent. If you are ***making monthly payments***, you should use 6%/12 (the annual rate divided by 12) as the rate and 2*12 (24 payments in total) as the ***nper***. If, on the other hand, you are making annual payments, you should use 6% (the annual interest rate) as the rate, and 2 (2 payments in total) as the ***nper***.

Let's say you want to calculate the Future Value (FV) based on the information provided below:

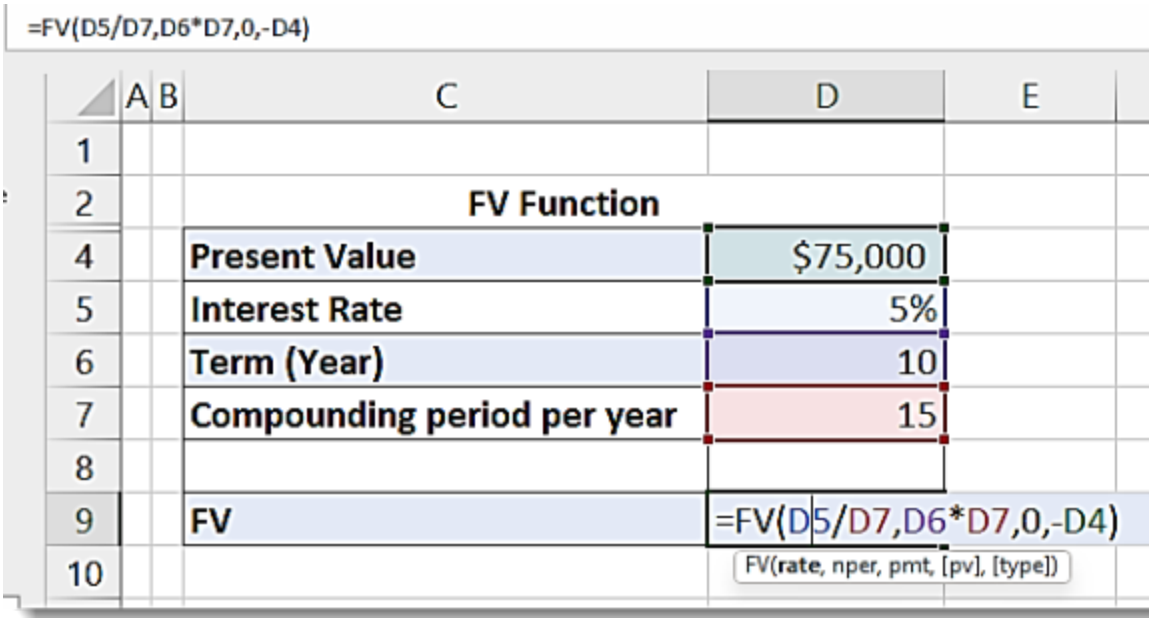
	A	B	C	D
1				
2			**FV Function**	
4			**Present Value**	$75,000
5			**Interest Rate**	5%
6			**Term (Year)**	10
7			**Compounding period per year**	15
8				

To calculate the correct result, you'll need to input the interest rate as a percentage or decimal form in cell **D5** and include the percent sign (i.e. **5%**

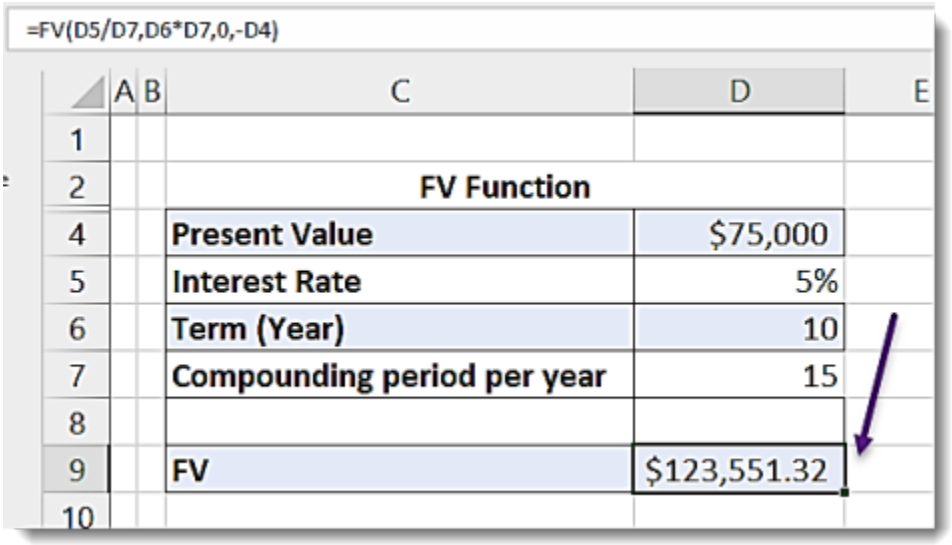
or **0.05**). The compounding period should be divided by **12**, since it occurs monthly. Additionally, the total number of payment periods should be divided by the compounding periods per year and entered as negative values for monthly payments.

So in cell **D9**, you have the formula entered as:

=FV(D5/D7,D6*D7,0,-D4)



The result gotten as the Future value is **$123,551.32** as illustrated below:


=FV(D5/D7,D6*D7,0,-D4)
A B C D E
1
2 FV Function
4 Present Value $75,000
5 Interest Rate 5%
6 Term (Year) 10
7 Compounding period per year 15
8
9 FV $123,551.32
10

NPV FUNCTION

The NPV, or Net Present Value Function, allows you to find the current worth of future monetary flows. It considers the initial expenditure's cost and interest rate to gauge the present value of a series of payments.

NPV = Present value (Pv) of Cash flows – Initial investment

The Net Present Function syntax is as follows:

NPV(rate,value1,[value2],...).

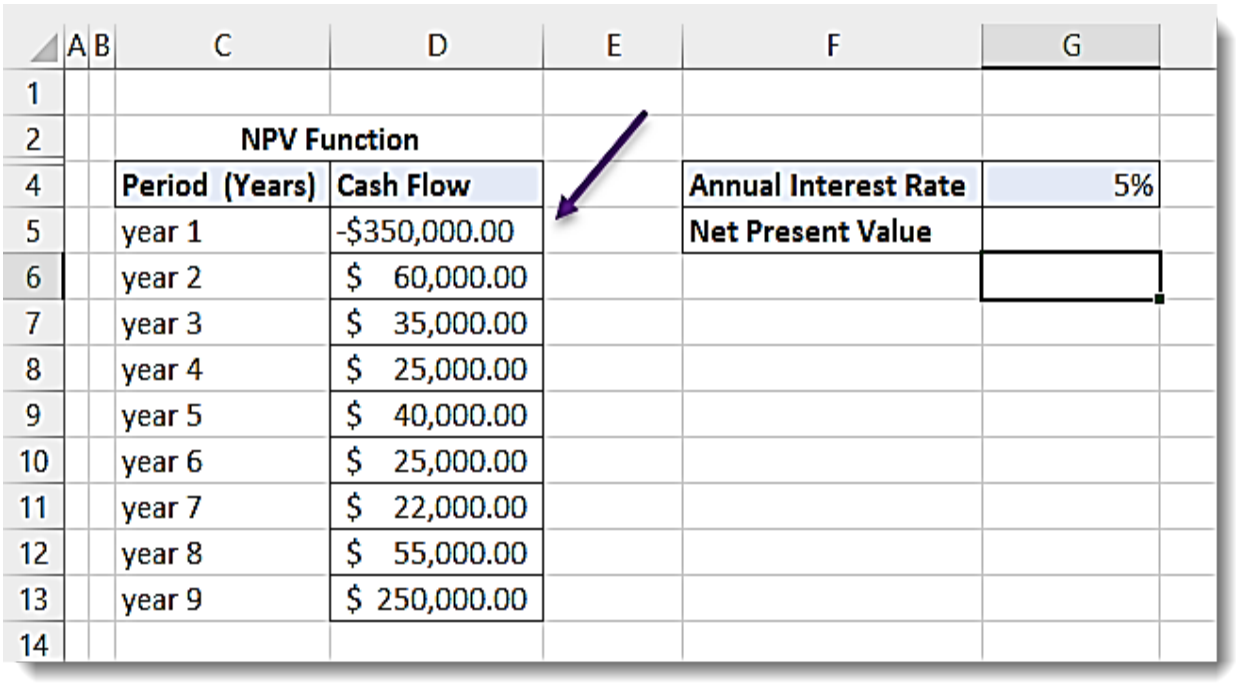
In this case, the rate is a required argument in the formula and represents the discount rate throughout the period.

The Value represents the cash flows (either outgoing or incoming). Outgoing is entered as a negative value, while an incoming payment is entered as a positive value. The value1 argument is required, while the subsequent values are optional. All the values should be evenly distributed and appear after every cycle.

When determining NPV, two potential outcomes may be encountered:

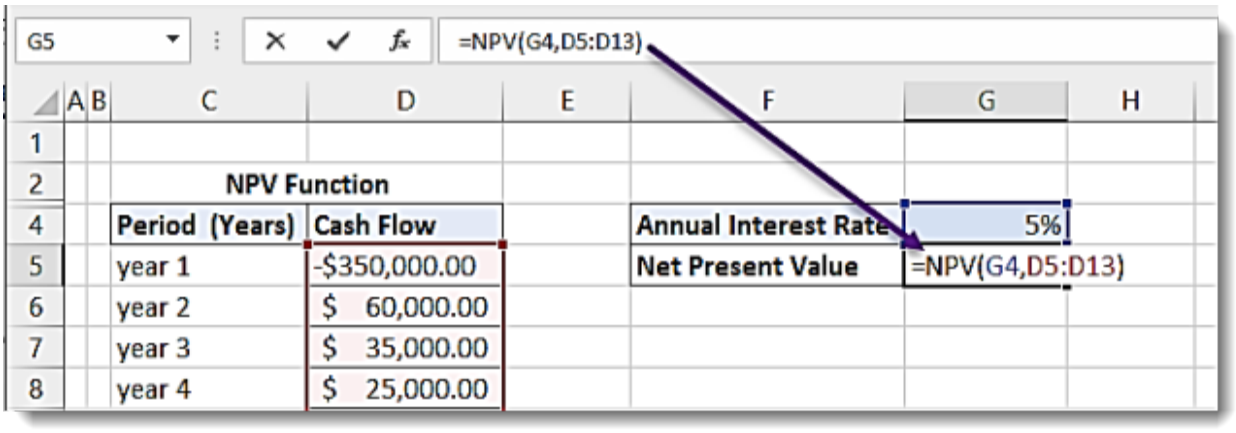
1. The first cash flow occurs at the **End of the First Period**.
2. The first cash flow occurs at the **Beginning of the First Period.**

In the example below, the data set in the worksheet contains cash outflows of $300,000 and happened at the end of the first year, where the Annual interest rate argument is entered in cell **G4**.



	C	D	F	G
2	NPV Function			
4	Period (Years)	Cash Flow	Annual Interest Rate	5%
5	year 1	-$350,000.00	Net Present Value	
6	year 2	$ 60,000.00		
7	year 3	$ 35,000.00		
8	year 4	$ 25,000.00		
9	year 5	$ 40,000.00		
10	year 6	$ 25,000.00		
11	year 7	$ 22,000.00		
12	year 8	$ 55,000.00		
13	year 9	$ 250,000.00		

The NPV function is calculated in cell C13 as:



	C	D	F	G
2	NPV Function			
4	Period (Years)	Cash Flow	Annual Interest Rate	5%
5	year 1	-$350,000.00	Net Present Value	=NPV(G4,D5:D13)
6	year 2	$ 60,000.00		
7	year 3	$ 35,000.00		
8	year 4	$ 25,000.00		

The formula returns a Net NPV of $35,900.13.

	A	B	C	D	E	F	G	H
1								
2			NPV Function					
4			**Period (Years)**	**Cash Flow**		**Annual Interest Rate**	5%	
5			year 1	-$350,000.00		**Net Present Value**	$35,900.13	
6			year 2	$ 60,000.00				
7			year 3	$ 35,000.00				

This means the investment will be profitable based on the cash flow and interest rate.

IRR FUNCTION

The Internal Rate of Return (IRR) is a function that determines the return on investment. It measures the rate at which the present value of the investment is equal to zero. If the Internal Rate of Return is higher than the cost of capital, then the investment is profitable, else not worthwhile.

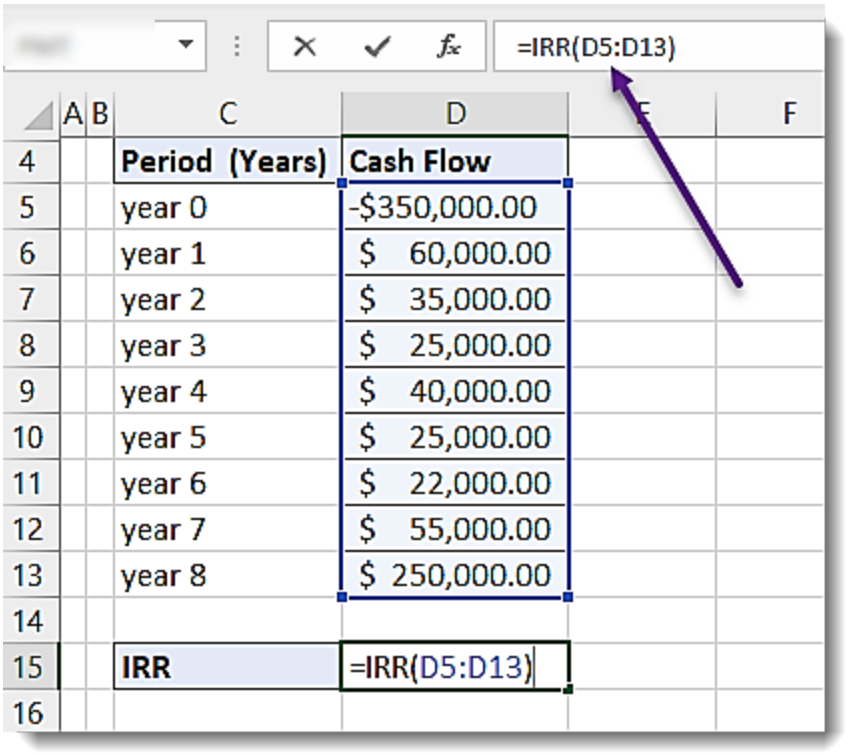
The IRR Function syntax is:

IRR(values,[guess]).

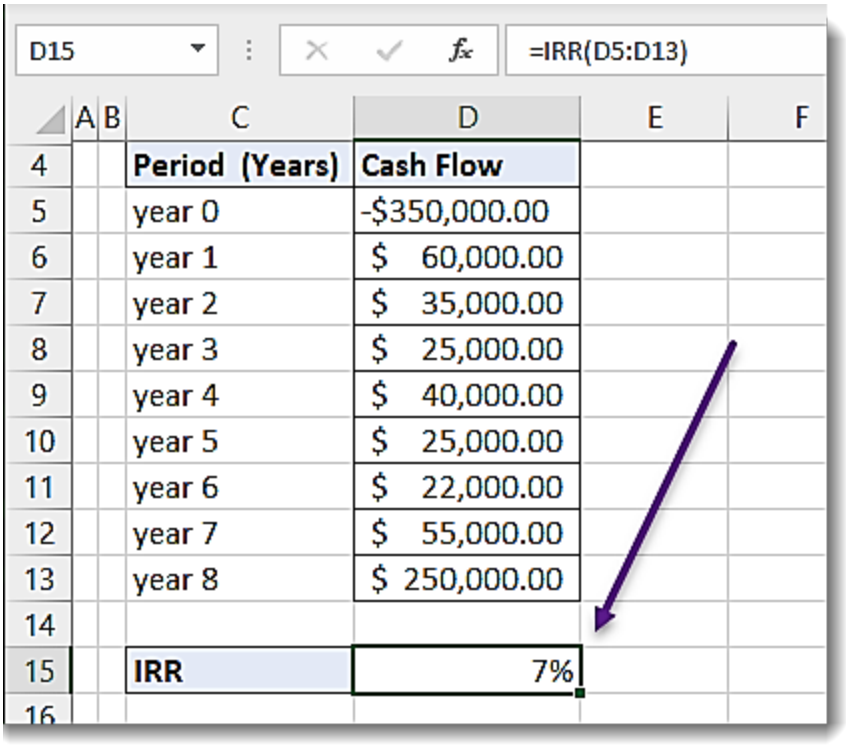
The values within this syntax are the cash flows, and the guess is an optional argument that is utilized to set the starting estimate for the internal rate of return.

The cash flow should include at least one negative and a positive value; otherwise, the IRR function will not give the correct result.

Using the illustration below, we can find the IRR from the data provided.



The result for the IRR is 7%, as shown below:



This is the rate of return that the investment's net present value will become zero. So you can now compare the Cost of Capital with the IRR to determine if it is profitable or not.

RATE FUNCTION

Using the RATE function in Excel, you can quickly calculate the interest rate for any loan or investment. All you need to do is input the total number of payment periods, the amount of the regular payment, and the present value of the loan or investment.

Regarding investments, the RATE function can be your guiding star. Let's say you want to invest $2,000 and reach a future value of $20,000 in 10 years. The RATE function can help you determine the interest rate needed to get you there. It's like a roadmap, showing you the most direct route to your financial destination.

Have you ever been confused by the interest rate on a loan you took or want to take? Using the RATE function can be a lifesaver when it comes to loans. With the RATE function, you can easily calculate the interest rate based on the amount borrowed, monthly payments, number of periods, and future value, if any. The RATE Function can help you understand the loan's actual cost and compare different loan options. It's like having a financial advisor by your side, helping you navigate the complex world of loans.

To use the RATE function, you'll need to input the following values:

- **Nper**: the total number of payment periods
- **Pmt**: the amount of the regular payment
- **Pv**: the present value of the loan
- **fv** is the future value; although it is optional to input this argument, it is the due date for payments (0 or 1),

If the payments are made at the start of each period, you use "0" as your future value, else, enter “1” if the payments are at the end of each period. For example, the formula for investment with payments made at the start of each period would be “0”.

- **guess** is also an optional argument stipulating the initial guess for the interest rate.

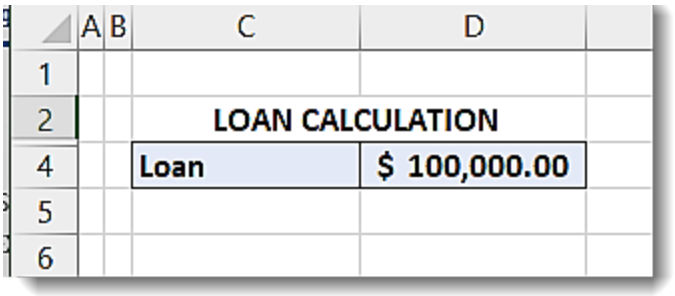
Once you've entered these values, Excel will calculate the interest rate for the loan.

Note that money is going out of your pocket when making an Investment (negative), while that of a Loan (positive) money is coming in.

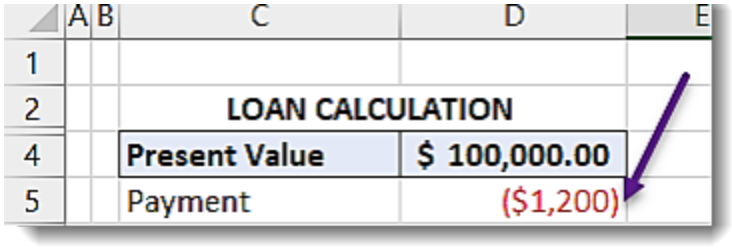
In the example below, the present value of the loan is $100,000 at an annual interest rate of 3%, the number of periods is 15, and the periodic payments are $1,200.

In the illustration below, you start by entering the title **LOAN CALCULATION** in cell **C2**.

Next, in cell **D4**, enter the present loan value as $100,000.



In cell **D5,** you enter the amount to be paid monthly as your **Payment**. In this case, it will be a negative value because the money is going out of your pocket. So you enter -$1200, and Excel will automatically use an open and close bracket around the value and turn the font red.



	A	B	C	D	E
1					
2			**LOAN CALCULATION**		
4			**Present Value**	**$ 100,000.00**	
5			Payment	($1,200)	

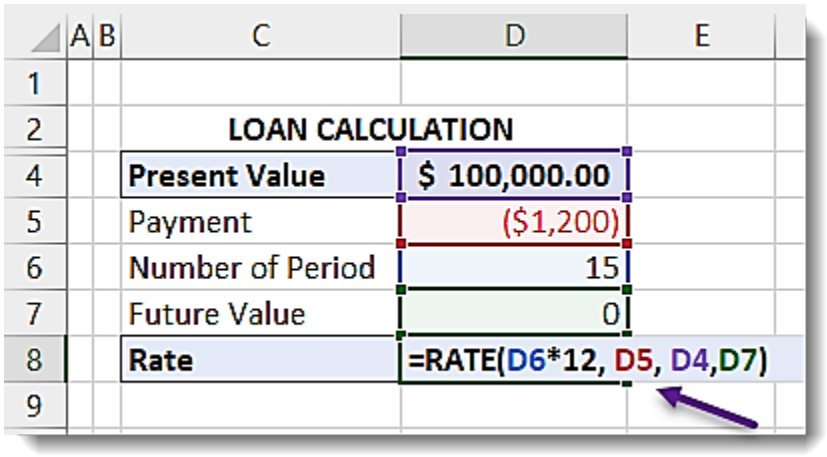
In cell **D6,** you enter the **Number of Periods** as 15, indicating the years to clear the loan. Next, you enter the **Future Value** in cell **D7**.

	A	B	C	D
1				
2			**LOAN CALCULATION**	
4			**Present Value**	**$ 100,000.00**
5			Payment	($1,200)
6			Number of Period	15
7			Future Value	0
8			**Rate**	
9				

However, the **Nper** argument in the formula will require multiplying the **Number of Periods** by 12 months. That will be entered as **D6 * 12**

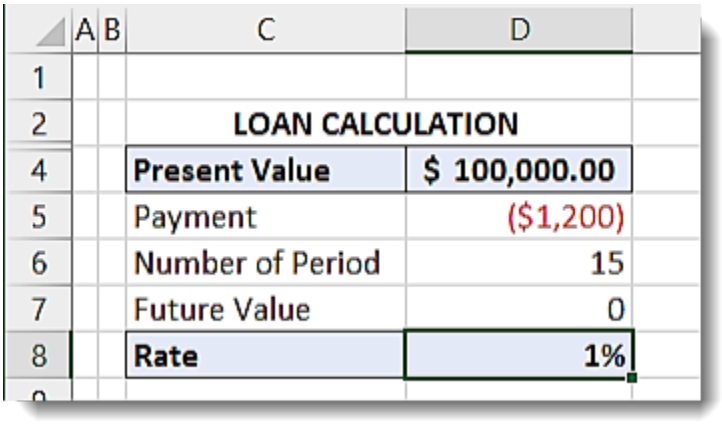
Cell **D8** will be used to calculate the **Rate** using the formula:

=RATE(D6*12, D5, D4,D7) and press **Enter**.



	A	B	C	D	E
1					
2			LOAN CALCULATION		
4			**Present Value**	**$ 100,000.00**	
5			Payment	($1,200)	
6			Number of Period	15	
7			Future Value	0	
8			**Rate**	=RATE(D6*12, D5, D4,D7)	
9					

The result for the Rate is 1%



	A	B	C	D
1				
2			LOAN CALCULATION	
4			**Present Value**	**$ 100,000.00**
5			Payment	($1,200)
6			Number of Period	15
7			Future Value	0
8			**Rate**	**1%**

When using the **RATE Function** for an investment, the Present Value is negative. So if the investment you did is $100,000, in Excel, it will be entered into cell **D4** as -$100,000.

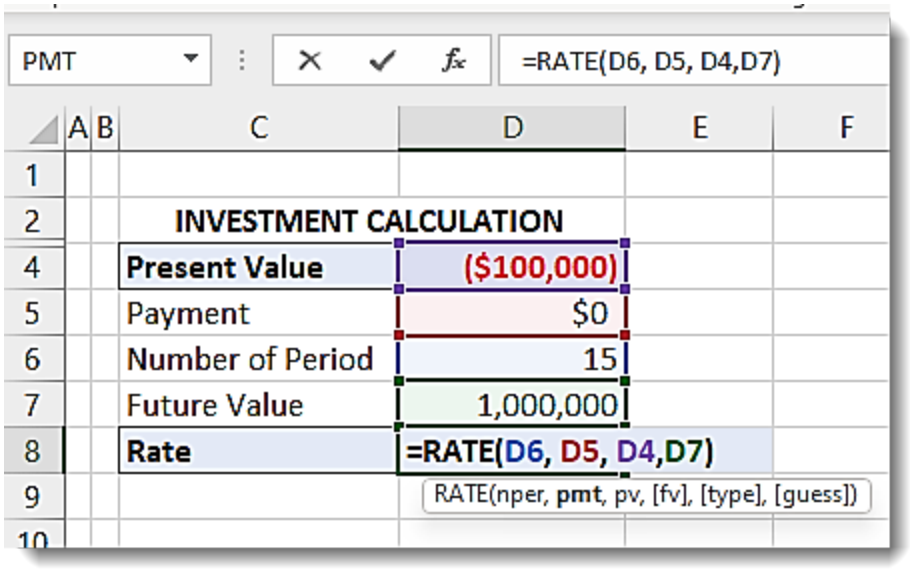
Investment does not come with monthly payments, so what will appear in cell **D5** is 0.

The **Number of Periods** is required and is up to you to decide and enter the value. In this example, we use 15.

The **Future Value** is what you want to have by the end of the value you choose for the **Number of Periods.** In this example, we use $1,000,000.

The formula is:

=RATE(D6,D5,D4,D7)



The result is **16.6%**

	A	B	C	D	E
1					
2			**INVESTMENT CALCULATION**		
4			**Present Value**	**($100,000)**	
5			Payment	$0	
6			Number of Period	15	
7			Future Value	1,000,000	
8			**Rate**	**16.6%**	
9					

LESSON 9

EXCEL KEYBOARD SHORTCUTS

Learning how to use shortcut keys is one of the best ways to get better at using the Excel application. You can use many keyboard shortcuts in Microsoft Excel to help you get things done faster and save time as you work.

For example, to open an Excel file, you press **Ctrl** + **O**. This means you press and hold the **Ctrl** key on your keyboard, then tap on the **O** key once.

Other keys include the function, Tab, Alt, Shift, Arrow, and Space keys.

You can also combine your keyboard keys and mouse buttons to create a shortcut.

- A plus (+) means you click and hold

- A comma (**,**) is mainly used after a plus (+). This means you must remove your hands from holding the previous key before using the following key.

BASIC SHORTCUTS

Undo the last action	Ctrl + Z
Redo the last action	Ctrl + Y
Copy selection	Ctrl + C
Cut a selection	Ctrl + X
Print	Ctrl + P
Paste clipboard content	Ctrl + V
Repeat the last action	F4

NAVIGATION SHORTCUTS

Move one cell right	Arrow ⇒
Move one cell left	Arrow ⇐
Move one cell up	Arrow ⇑
Move one cell down	Arrow ⇓
Move one Screen Up	Page Up (**Pg Up**)
Move Screen Down	Page Down (**Pg dn**)
Move to the edge of the First row in a Worksheet	Ctrl + Home
Move after the end of the last cell containing Data	Ctrl + End

WORKBOOK SHORTCUTS

Create a New Workbook	Ctrl + N
Open Workbook	Ctrl + O
Save a Workbook	Ctrl + S
Go to the Next Opened Workbook	Ctrl + Tab
Go to the Previous Open Workbook you viewed	Ctrl + Shift + Tab
Minimize the Current Workbook Window	Ctrl + F9
Maximize the Current Workbook Window	Ctrl + F10
Protect a Workbook	Alt + R, **P** W
Close Current Workbook	Ctrl + F4
Close the Excel Application	Alt + F4

RIBBON SHORTCUTS

Expand or Collapse the Ribbon	Ctrl + F1
Activate access to the Ribbon keys	Alt
Move through Ribbon features	⇒ ⇐ ⇑ ⇓
Help	F1

WORKSHEET SHORTCUTS

Insert a New Worksheet	Shift + F11
Go to the Next Worksheet	Ctrl + Page Down
Go to the Next Worksheet	Ctrl + Page Up
Rename the Current Worksheet	Alt + O, **H** R
Delete the Current Worksheet	Alt + E, **L**
Move the Current Worksheet	Alt + E, **M**
Open the Print Preview Window	Ctrl + F2
Set Worksheet Print Area	Alt + P , **R** S
Clear the Worksheet Print Area	Alt + P, **R** C
Zoom in on the Current Worksheet	Ctrl + Mouse Wheel Up
Zoom out on the Current Worksheet	Ctrl + Mouse Wheel Down
Protect the Worksheet	Alt + R, **P** S

SELECTION SHORTCUTS

Select entire row	Shift + Space
Select entire column	Ctrl + Space
Manual Expanded Selection	Shift + Mouse Left Click
Random Selection Mode	Shift + F8
Expand Selection to the Right	Shift + ⇒
Expand Selection to the Left	Shift + ⇐
Expand Selection Upwards	Shift + ⇑
Expand Selection Downwards	Shift + ⇓
Expand Selection to the last cell with data allow a row or column towards your Rght	Ctrl + Shift + ⇒
Expand Selection to the last cell with data allow a row or column towards your Left	Ctrl + Shift + ⇐
Expand Selection To The Last Cell With Data Downward	Ctrl + Shift + ⇓
Expand Selection to the last cell with data Upward	Ctrl + Shift + ⇑
Expand Selection to the First row(s)	Shift + Home

Expand Selection to the First cell in a Worksheet	Ctrl + Shift + Home
Expand Selection to the Last cell in a Worksheet	Ctrl + Shift + End
Exit Selection Mode	Esc

CELL SHORTCUTS

To Edit the Content of a cell	F2
Expand Selection to the First cell	Shift +Home
Expand Selection to the End of Cell	Shift + End
Delete data to the Left of a Cursor	Backspace
Delete data to the Right of a Cursor	Delete
Create a New line within a Cell while Typing	Alt + Enter
Move Down after Entering Data	Enter
Move Up after Entering Data	Shift + Enter
Move Left after Entering Data	Shift + Tab
Move Right after Entering Data	Tab
Enter Data and Stay in the Same Cell	Ctrl + Enter
Insert Current Date	Ctrl + ;
Insert Current Time	Ctrl + Shift + :
Paste the same data in multiple cells	Enter
Fill Down Data from a Cell Above	Ctrl + D
Fill Data to the Right from a Cell on the Left	Ctrl + R
Copy the data / Formula from a Cell directly Above	Ctrl + ‘
Copy Value from a Cell Directly Above	Ctrl + Shift + “

FORMATTING SHORTCUTS

Display Format cells dialog box	Ctrl + 1
Bold Font	Ctrl + B
Italic Font	Ctrl + I
Underscore	Ctrl + U
Strikethrough	Ctrl + 5
Align Data to the Center of a Cell	Alt + H, **A** C
Align Data to the Left of a Cell	Alt + H, **A** L
Align Data to the Right of a Cell	Alt + H, **A** R
Wrap Data in a Cell	Alt + H , **W**
Indent Data in a Cell	Alt + H , **6**
Remove Indent on Data in a Cell	Alt + H , **5**
Align Data to the Top of a Cell	Alt + H , **A** T
Align Data to the Middle of a Cell	Alt + H , **A** M
Align Data to the Bottom of a Cell	Alt + H , **A** B
Increase Font size of Data in a Cell by One Step	Alt + H , **F** G
Increase Font size of Data in a Cell by One Step	Alt + H , **F** K
Change Format of Data in a Cell to a General Format	Ctrl + Shift + ~
Change Format of Data in a Cell to a Number Format	Ctrl + Shift + !

Change Format of Data in a Cell to a Time Format	Ctrl + Shift + @
Change Format of Data in a Cell to a Date Format	Ctrl + Shift + #
Change Format of Data in a Cell to a Currency Format	Ctrl + Shift + $
Change Format of Data in a Cell to a Percentage Format	Ctrl + Shift + %
Change Format of Data in a Cell to a Scientific Format	Ctrl + Shift + ^
Add Black Border to a Cell	Ctrl + Shift + 7
Remove Black Border on a Cell	Ctrl + Shift + _

ROWS AND COLUMNS SHORTCUTS

Show Insert Row Dialog box	Ctrl + Shift ++
Show Delete Row Dialog box	Ctrl + -
Delete Data in a Cell(s)	Delete
Hide Column(s)	Ctrl + 0
Hide Row(s)	Ctrl + 9
Unhide Row(s)	Ctrl + Shift + 9

LESSON 10

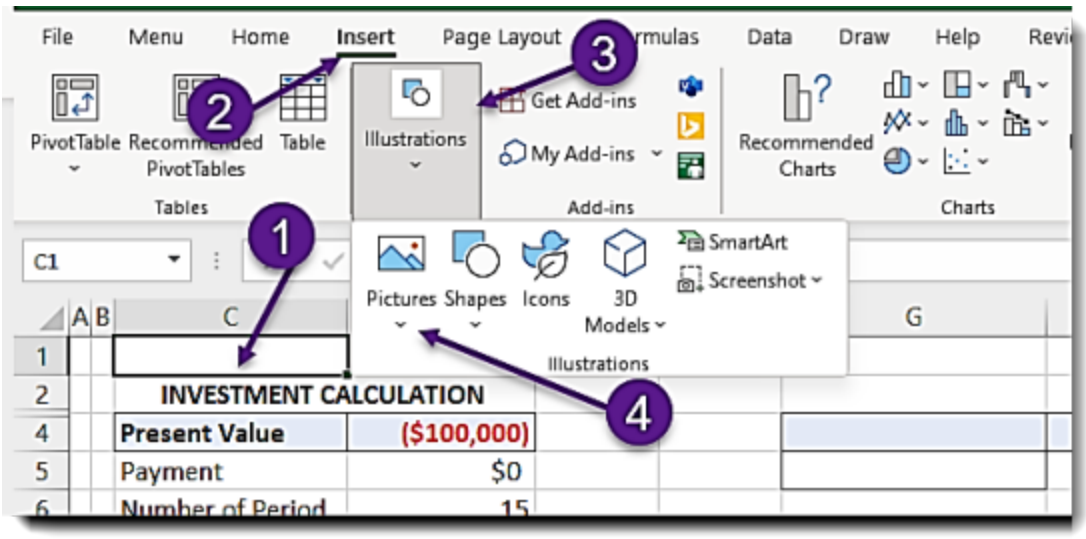
IMAGES AND SHAPES IN EXCEL

Inserting images and shapes into an Excel worksheet enhances your document's visual appeal and readability. It is simple to learn how to add images and shapes to an Excel worksheet, whether adding a picture of your company logo or a diagram to illustrate a piece of data.

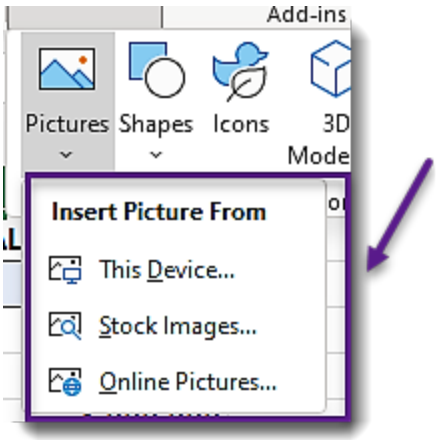
INSERTING IMAGES

To insert an image into an Excel worksheet, you must first click on the location where you want the image to appear.

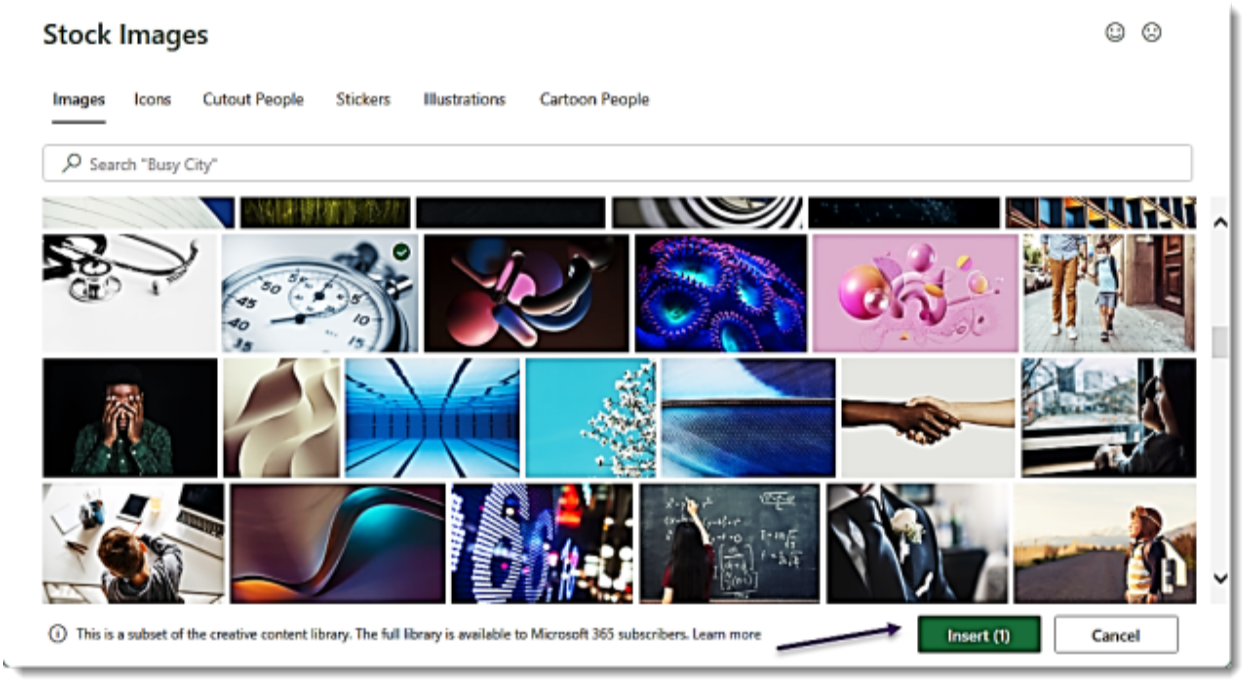
Then, click the "**Insert**" tab of the ribbon and select "**Picture**" from the Illustrations group.



Once you have selected "**Picture**," you can choose a picture from your computer or search for one online.



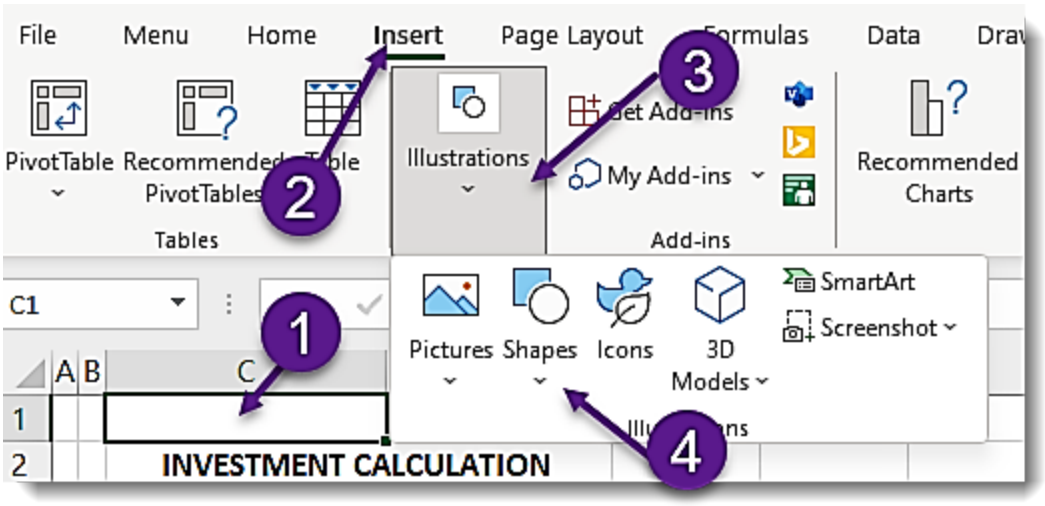
Once you've selected the image you'd like to insert, click "**Insert,**" and the image will appear on your worksheet.



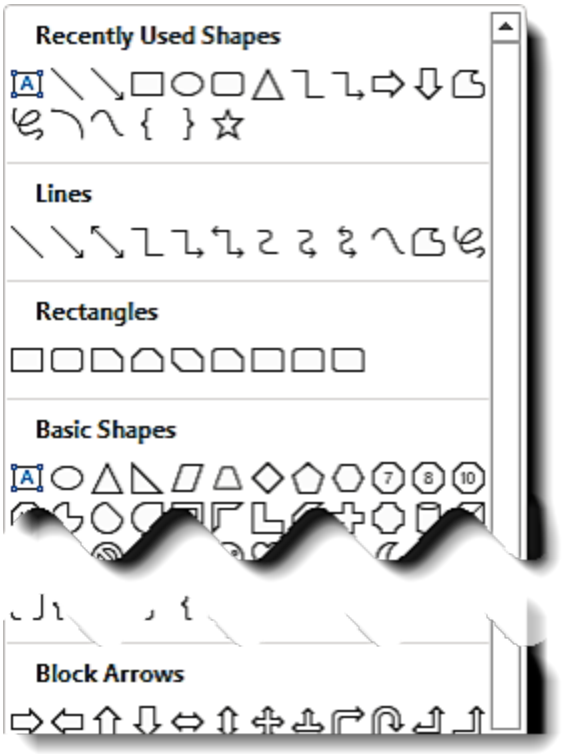
INSERTING SHAPES

In a Microsoft Excel worksheet, using shapes can effectively call attention to particular pieces of information.

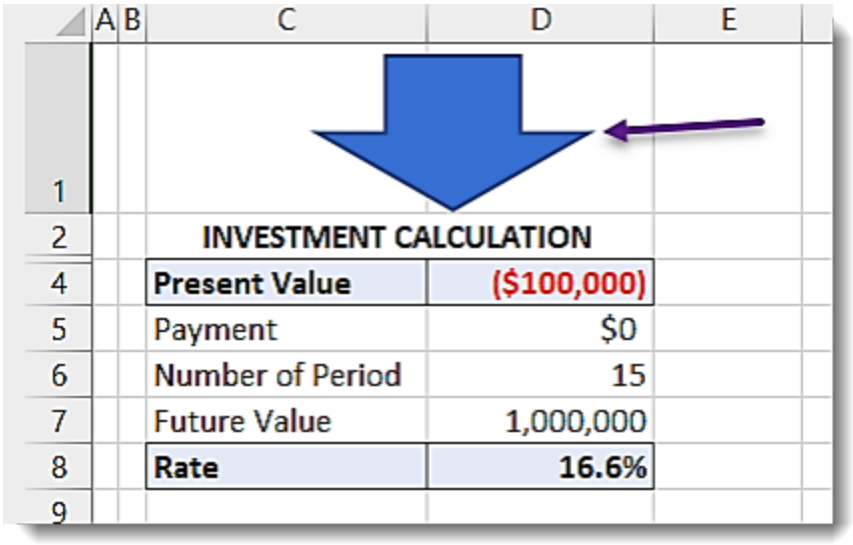
To insert a new shape, click on the "**Insert**" tab of the ribbon and select "**Shapes**" from the Illustrations group.



When you choose the **Shapes** menu item, the side pane will expand to reveal a wide variety of shapes for you to select from, including arrows, stars, and other options.



After selecting the desired shape, you can create it by clicking and dragging the mouse pointer on the worksheet. The shape will be inserted into the sheet when you let go of your mouse button.



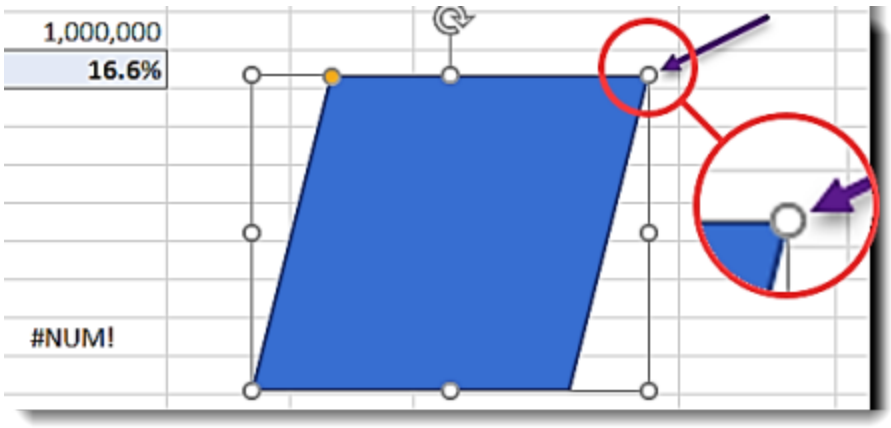
	A	B	C	D	E
1					
2			**INVESTMENT CALCULATION**		
4			**Present Value**	**($100,000)**	
5			Payment	$0	
6			Number of Period	15	
7			Future Value	1,000,000	
8			**Rate**	**16.6%**	
9					

CUSTOMIZING YOUR SHAPES AND IMAGES

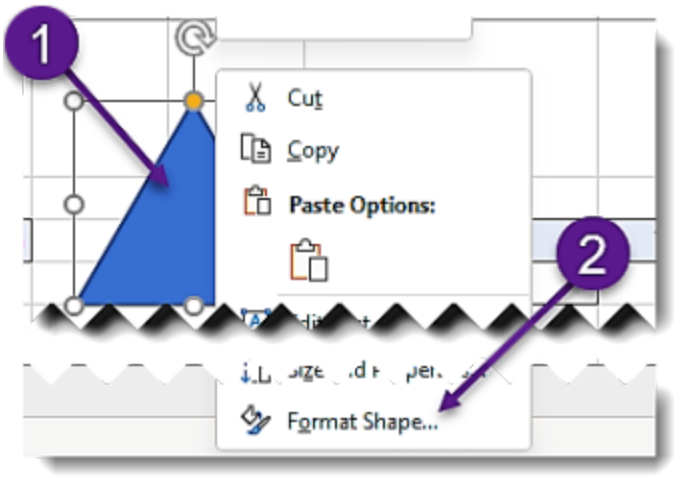
You can customize shapes and images inserted into a worksheet by changing their color, size, and effects. You can also insert text or move the shape or image around in the worksheet. Additionally, you can apply formatting options such as shading and border lines to your shapes and images.

RESIZING AND POSITIONING SHAPES AND IMAGES

To change the size or location of shapes or images inserted in an Excel worksheet, select the object you want to adjust, and immediately, the sizing handle will appear. Click on any of the white circles (sizing handles) to adjust the size of the shape or image by dragging it in or out of the object's center.



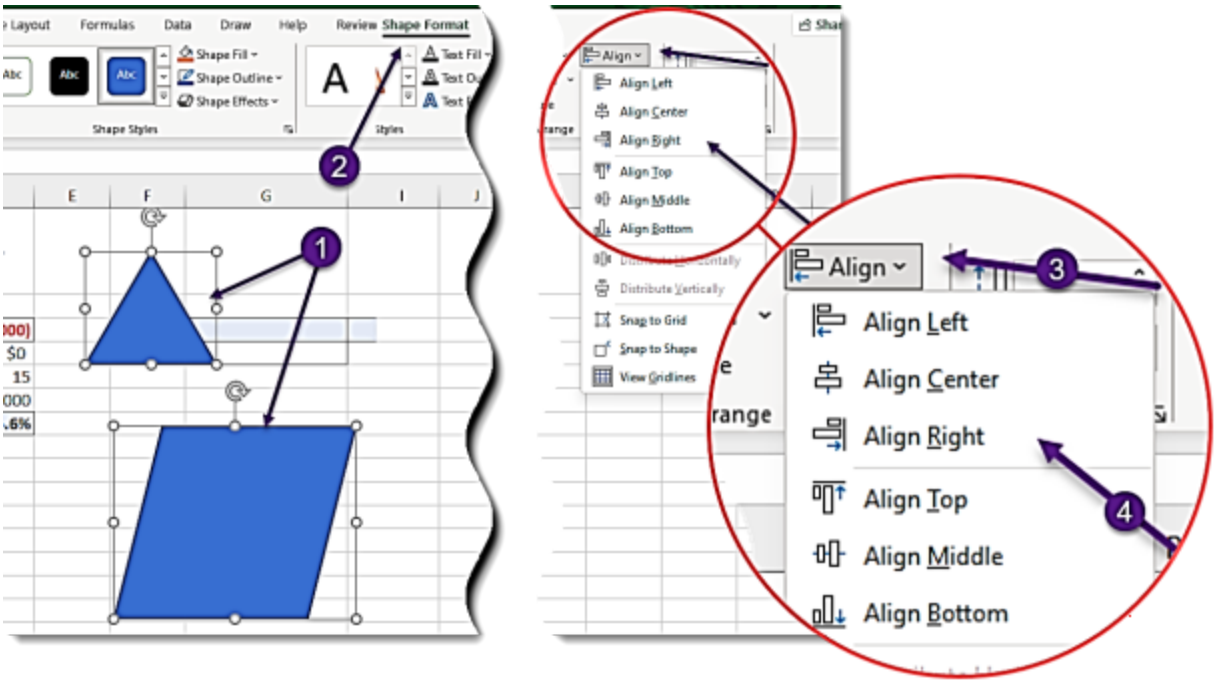
You can also **right-click** on the object or shape and select "Format Shape" to access more advanced features, like rotating, flipping, or modifying the aspect ratio.



To reposition the object, you click on the shape or object and drag it to the desired spot within your worksheet or use the arrow keys on your keyboard for more exact movements.

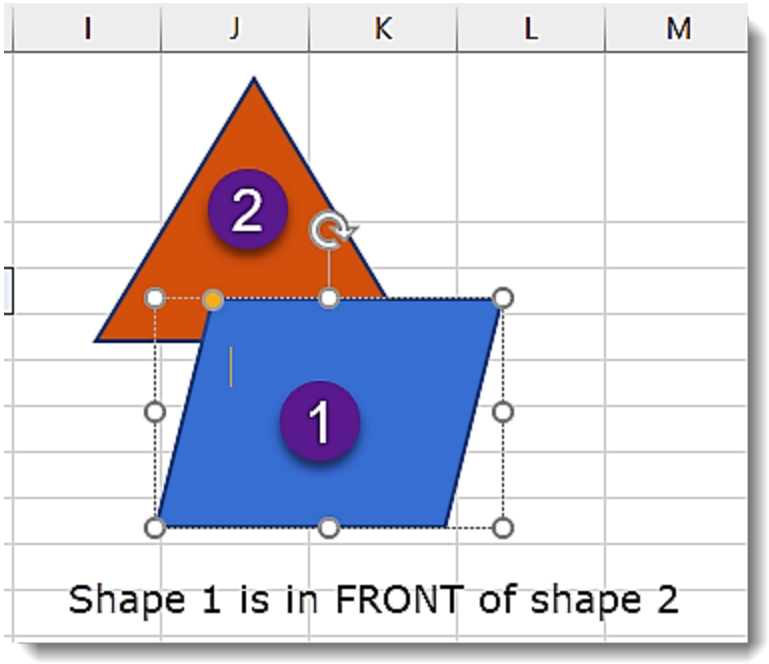
OBJECTS ALIGNMENT AND DISTRIBUTION

Additionally, you can take advantage of the "**Align**" and "**Distribute**" options under the "**Format**" tab to line up several objects relative to each other.

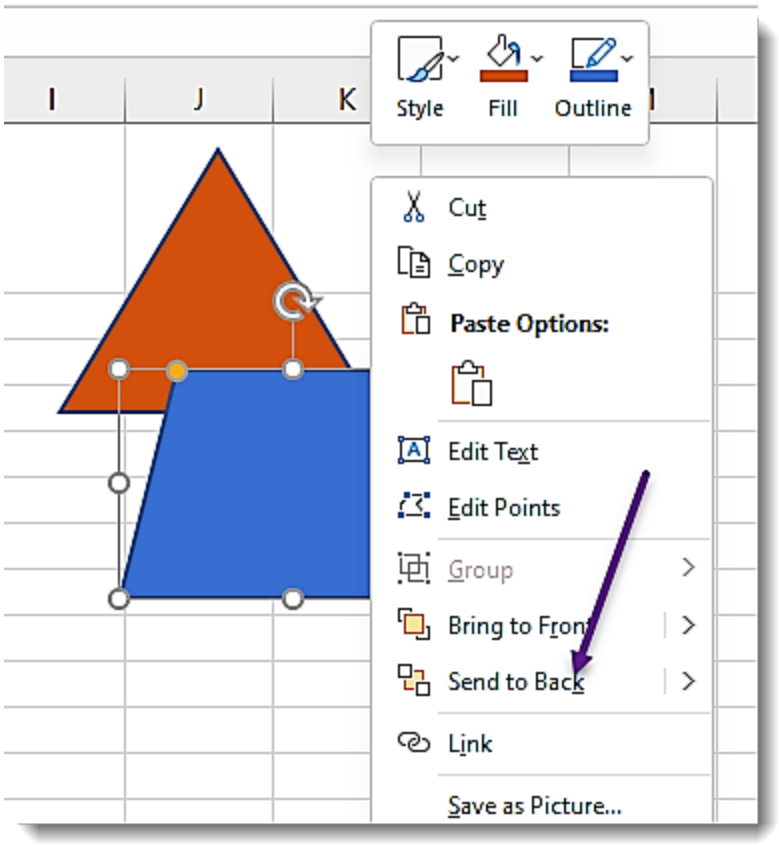


SEND TO BACK FEATURES

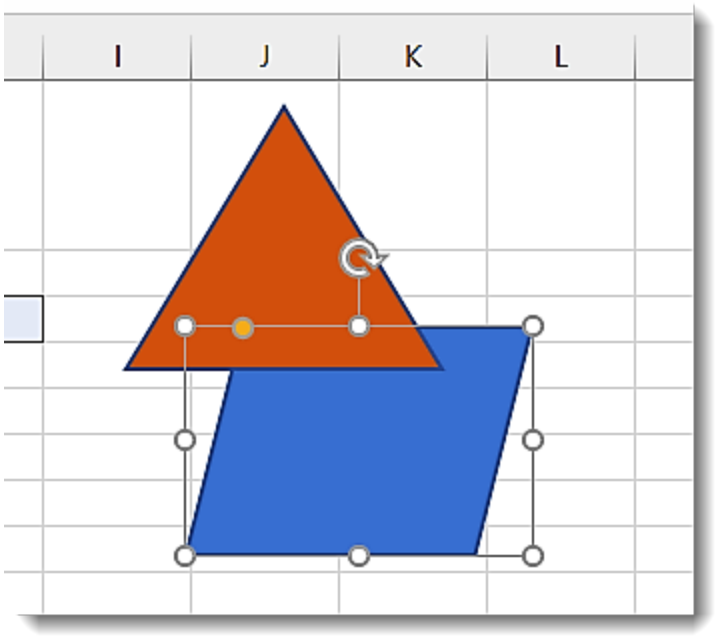
Send to Back feature allows you to change the layering of shapes or images on a worksheet.



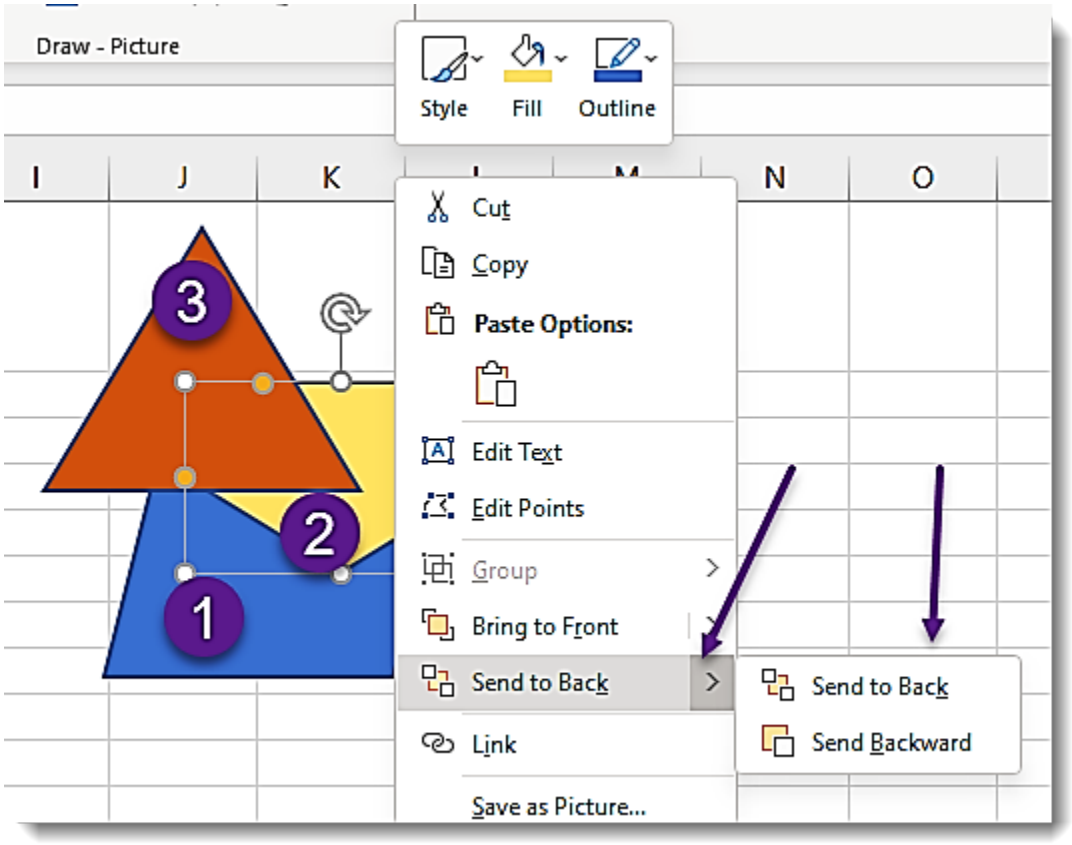
To use this **Send to Back** feature, select the shape or image you want to move first, right-click, and select "**Send to Back**" from the context menu.



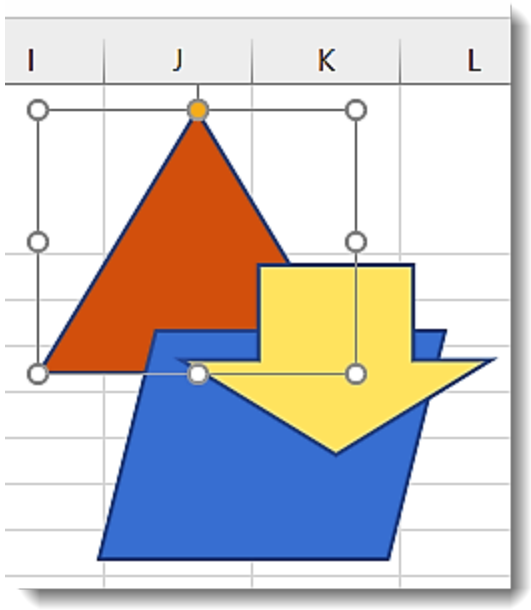
The "**Send to Back**" command will move shape 1 backward to the bottom or the last layer.



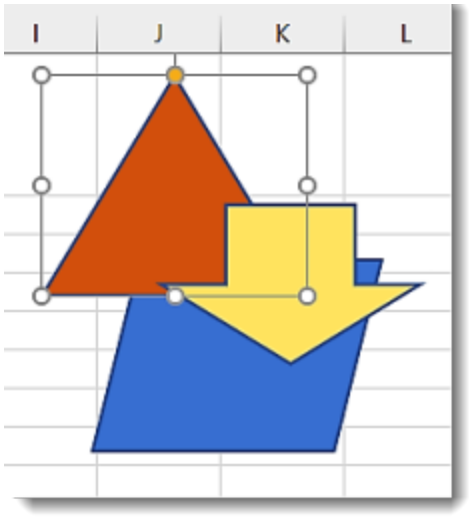
Where you have more than two objects to handle, you can click the arrow button by the right of the **Send to Back** command to view the two options available.



If you select Shape 3 (triangle) and use the **Send to Back** command, the shape will move to the bottom layer at the back of Shape 1.



But using the **Send Backward** option will only send Shape 3 one layer back (moving it to the back of Shape 2).

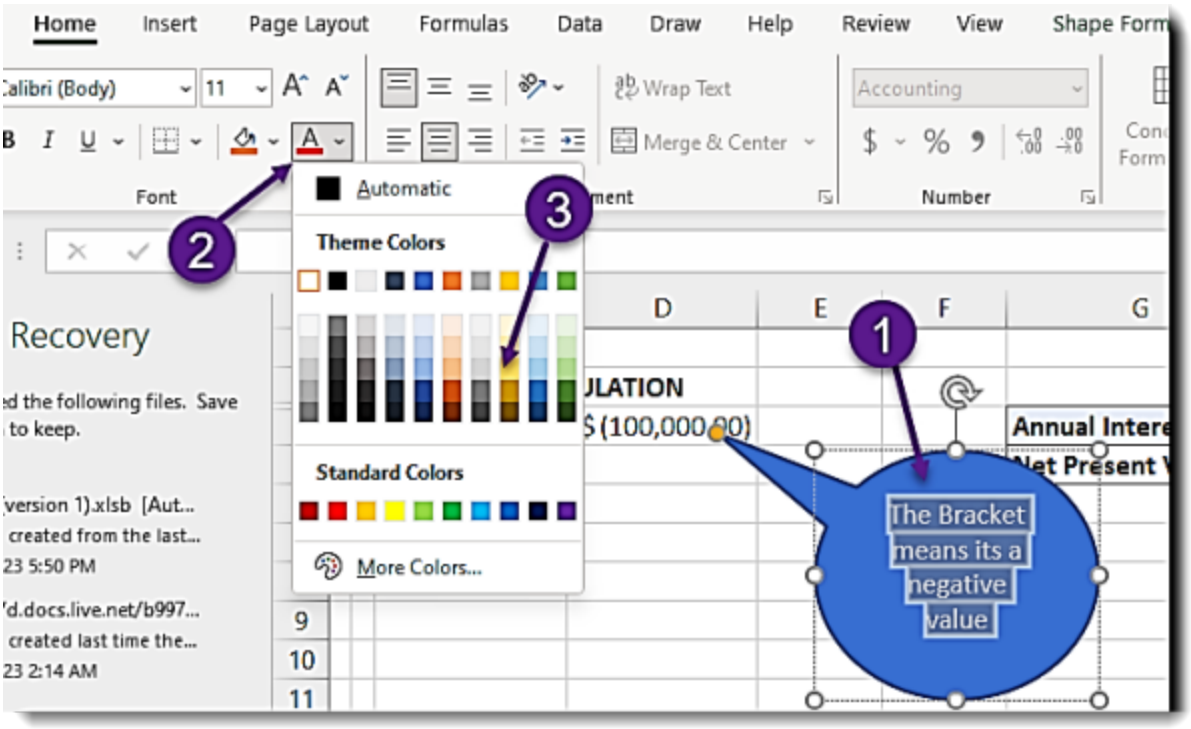


When you have more than two objects overlapping each other on different layers, the "**Send Backward**" will give you more control.

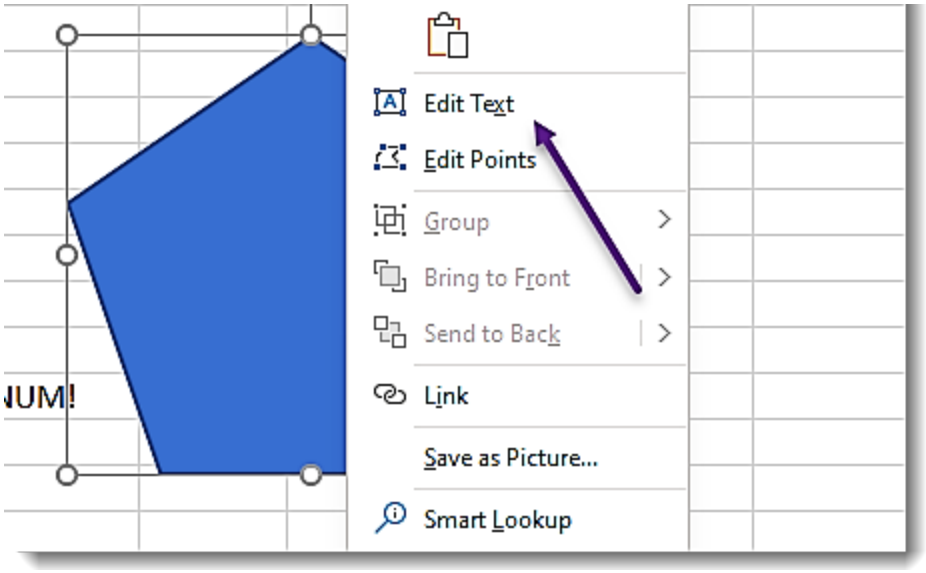
ADDING TEXT TO SHAPES

You can add text to any shape you have already inserted into an Excel worksheet by double-clicking on the shape to select it and begin typing.

You can also change the font's style, size, or color by highlighting the text and utilizing the "**Home**" tab formatting choices.



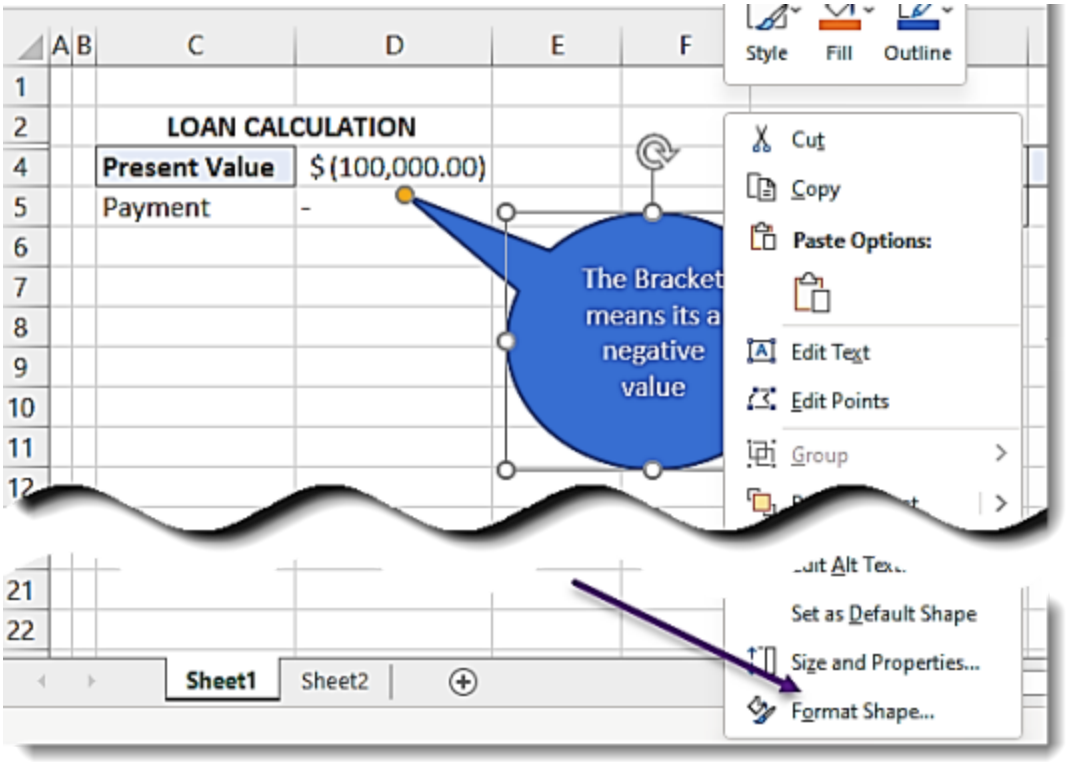
Another method to add text to an existing shape is by selecting "**Edit Text**" from the context menu when you right-click the shape.


NUM!
Edit Text
Edit Points
Group
Bring to Front
Send to Back
Link
Save as Picture...
Smart Lookup

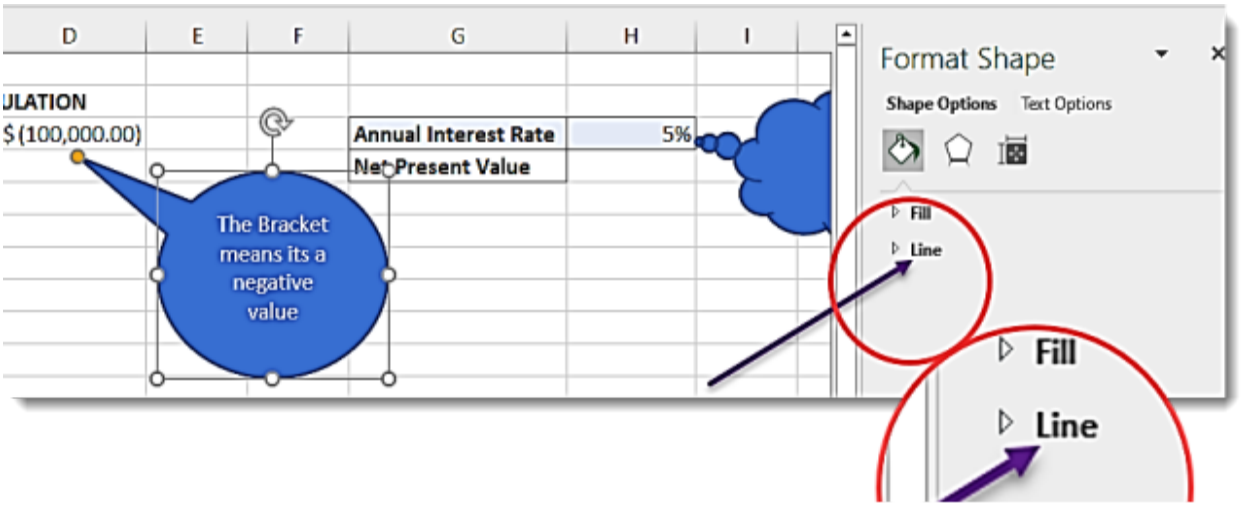
ADDING BORDER TO SHAPES

Adding a border to a shape inserted in Excel is like adding a frame to a work of art. A border can highlight the vital information in your spreadsheet and make it stand out.

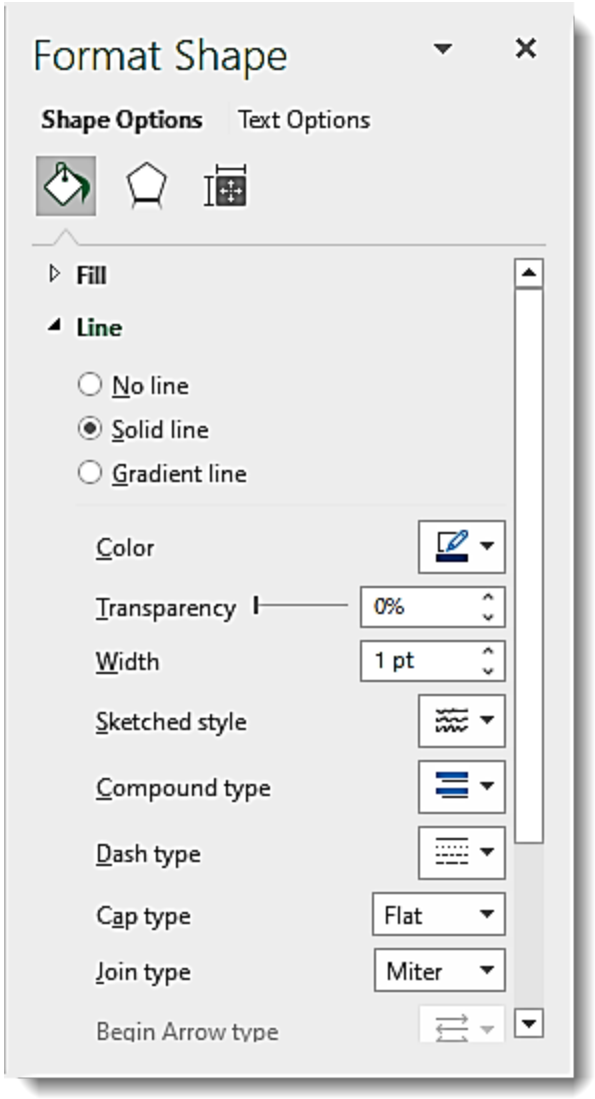
First, select the shape to which you want to add a border and right-click. From the contextual menu, select **“Format Shape”**.



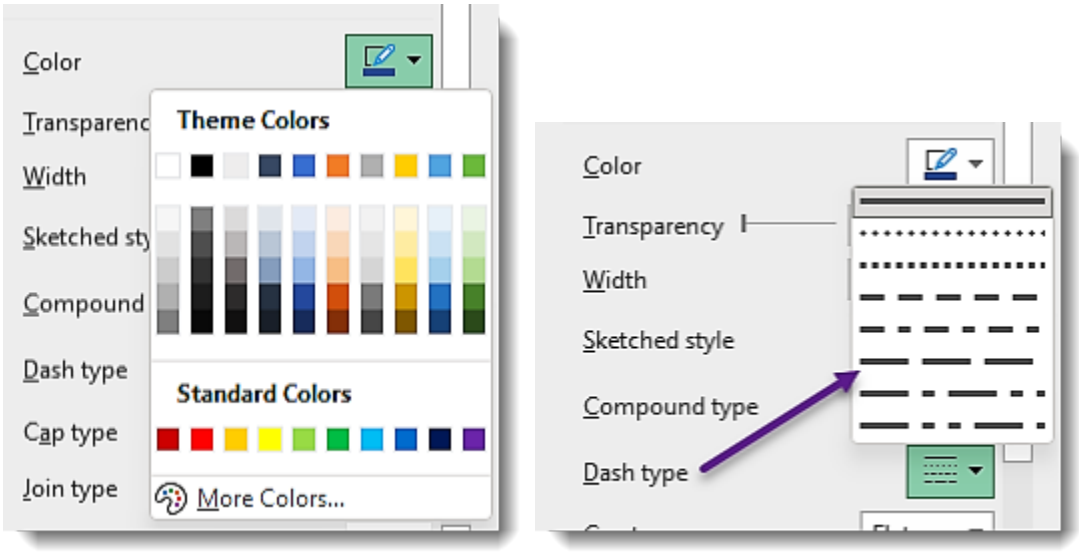
Then, head over to the "**Format Shape**" tab; you will find a drop-down menu labeled "**Shape Options**."



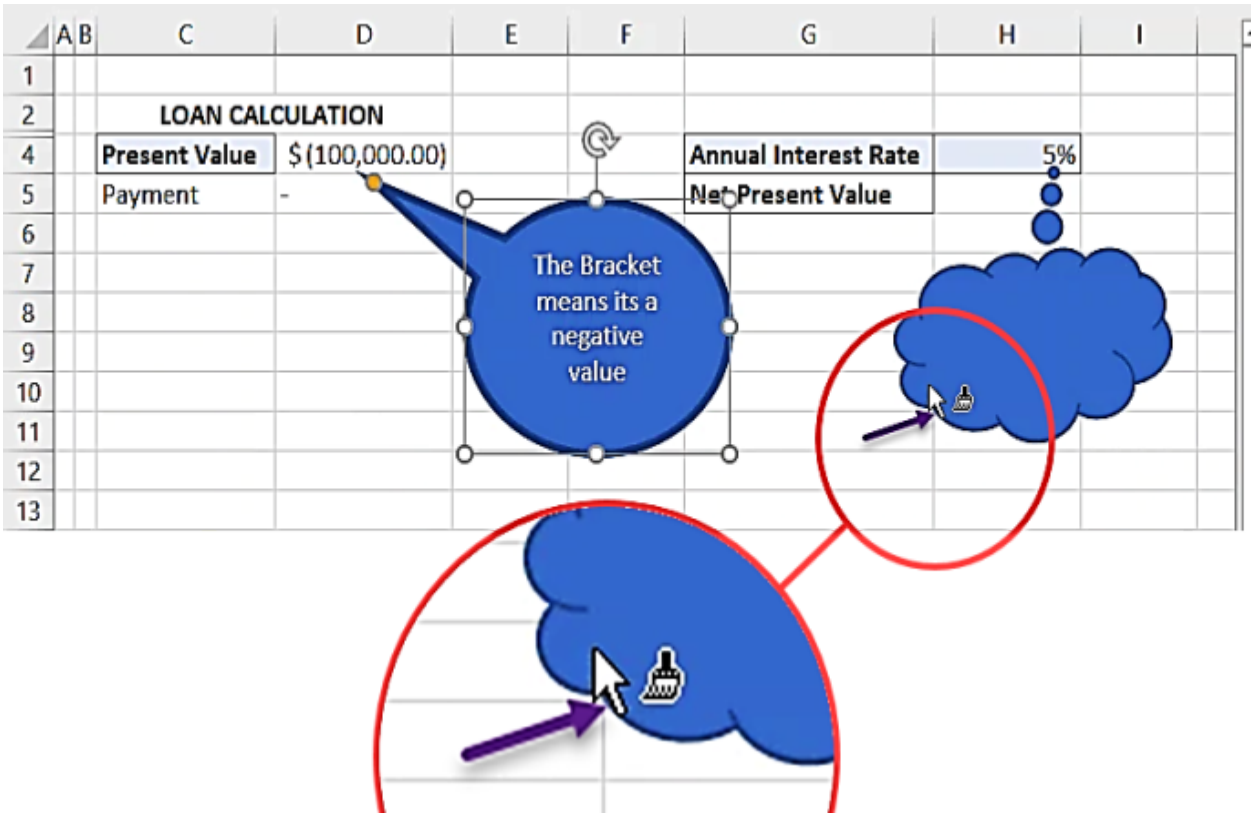
Click on the **Line** option to open the drop-down menu.



Now, the fun part. Choose the **Color** and **Dash type** you want for your border.



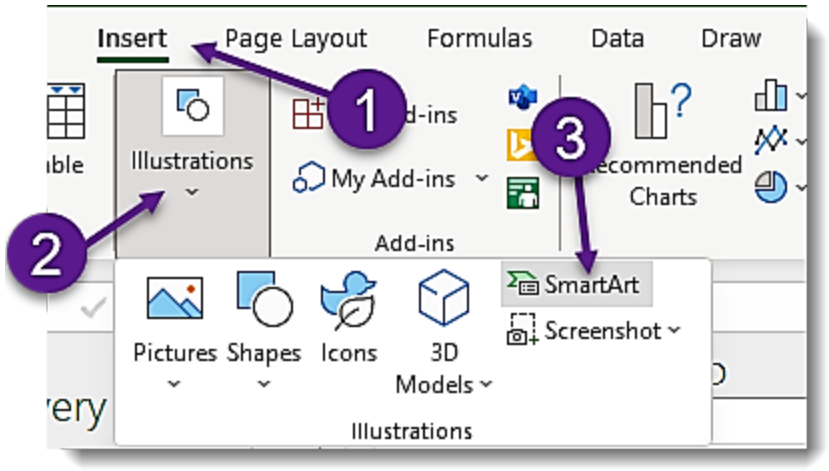
Select any of the **Dash** types for the border, like a dotted or dashed line. And if you want to apply the same border to other shapes in your worksheet, you can use the "**Format Painter**" tool.



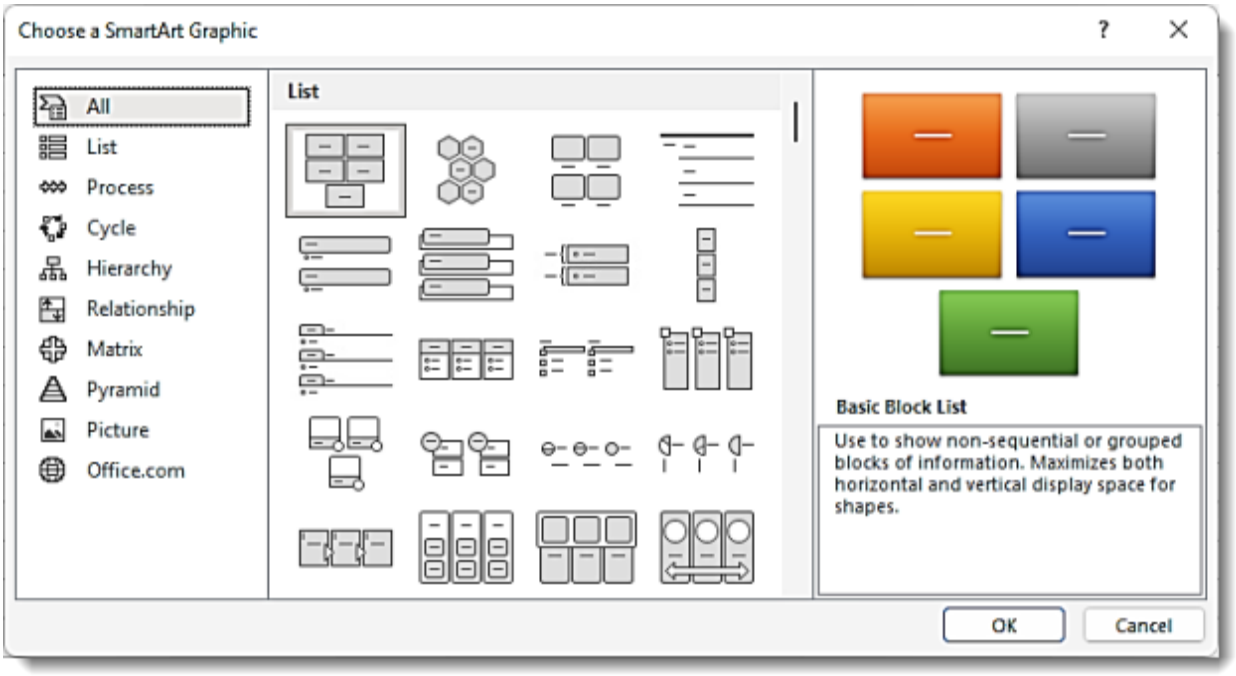
WORKING WITH EXCEL SMARTART

SmartArt is an excellent tool for organizing and categorizing data, making it simple for anyone looking at your data to understand the information flow. With various options, including hierarchies and cycles, you may tailor the tools to the particular needs of any presentation.

Select the data you want to show visually to start with SmartArt, and then click "**SmartArt**" under the "**Insert**" tab.



You will see a category of options, like hierarchies, processes, and cycles.



Choose the one that suits your data, and then add shapes, modify the color scheme, and add text as desired.

LESSON 11

CHARTS IN EXCEL

Charts are one of the Excel application's most valuable and flexible features. Charts in Excel are a powerful tool you can use to show data in a way that is clear and easy to understand. Excel charts make it easy and quick to look at large amounts of data and draw conclusions.

However, if you want to create a good chart in Excel, you need to understand the basic rules of data visualization. You must be careful when creating charts to show your data correctly and bring out the most critical points.

Also, different charts work better with different kinds of data, and picking the wrong chart can lead to confusion and false conclusions.

Whether you are a student, researcher, or professional in any field, Lesson 11 will give you a complete guide to making charts in Excel. It will cover all the major chart types and provide tips on creating compelling visualizations. You will learn about the basic ideas behind data visualization and show how different charts can be used in various fields.

WHY DATA VISUALIZATION IN EXCEL?

Managing vast amounts of data can be confusing and difficult to interpret without proper visualization. This is where data visualization comes into play. Excel charts simplify understanding even the most complex data sets because they can turn complex data into clear and concise graphs. With Excel, you can find trends, patterns, and connections you might not have seen otherwise. And with just a few clicks, you can make beautiful charts that show your results clearly and effectively.

However, creating effective charts in Excel is not just about throwing some numbers onto a graph. To truly unleash the power of data visualization, you need to understand the underlying principles and best practices. You need to choose the right chart type, design it to accurately represent the data, and highlight the key takeaways your audience needs to know.

FUNDAMENTAL IDEAS REGARDING CHARTS IN EXCEL.

Knowing the basics of Excel charts is essential to create visualizations that make sense and are helpful. Excel Charts can be in different forms, such as bar charts, line graphs, scatter plots, and pie charts.

When creating an Excel chart, it's essential to consider your data type. For example, a bar chart or line graph might work best if your data is about numbers. But a pie chart might be better if your data is about categories. It's also essential to consider who will look at your chart, as different charts can be better for others.

Another thing to consider is the data you will use in the chart. Each column should represent something different, and the data shouldn't have any mistakes or odd numbers but be well-organized and easy to understand.

You can make your chart look nice by changing the colors, fonts, and styles. You must also consider adding the chart's title, labels, and legend. These things help explain your chart and make it easier to understand. But don't go overboard – ensuring people can still understand the data is essential.

Excel charts are also suitable for data analysis. You can use trendlines, error bars, and data tables to understand the data's meaning and find patterns.

Meanwhile, note that Excel charts have their limits. Sometimes, charts can not show more complex data or might not be the best way to explain your data. Plus, people might see things in the chart that need to be added because of their ideas or how things are said.

CREATING CHARTS IN EXCEL

SELECTING DATA

Selecting the appropriate data when creating Excel charts is crucial to creating an effective and accurate visual representation of your data. Below are some extra tips for selecting data in Excel:

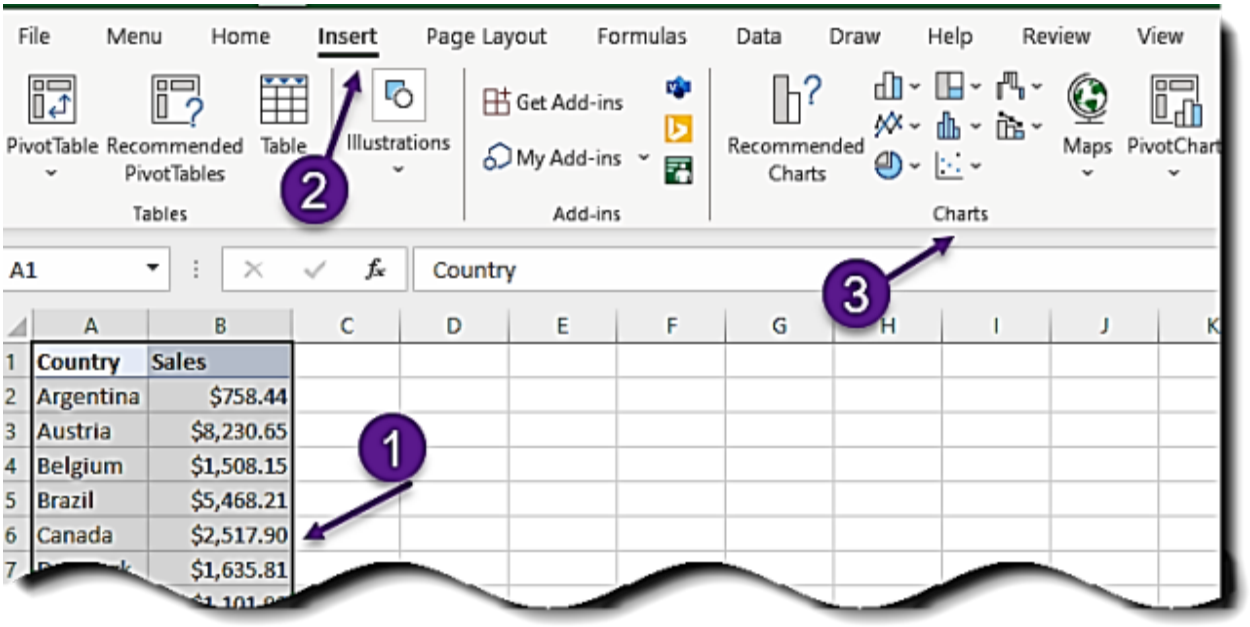
- Ensure that your data is well-organized, cohesively, and consistent, making selecting the data required for your chart easier.
- Be cautious not to incorporate redundant or irrelevant data in your selection since it can lead to confusion and misinterpretation of the chart.
- If you are working with extensive data sets, it may be helpful to employ Excel's filtering tools to assist in selecting the required data. For instance, you may filter by date range or specific values to narrow your selection.
- Utilize clear and descriptive row and column headers to make selecting the correct data easier. This will also enhance the chart's legibility and comprehensibility.



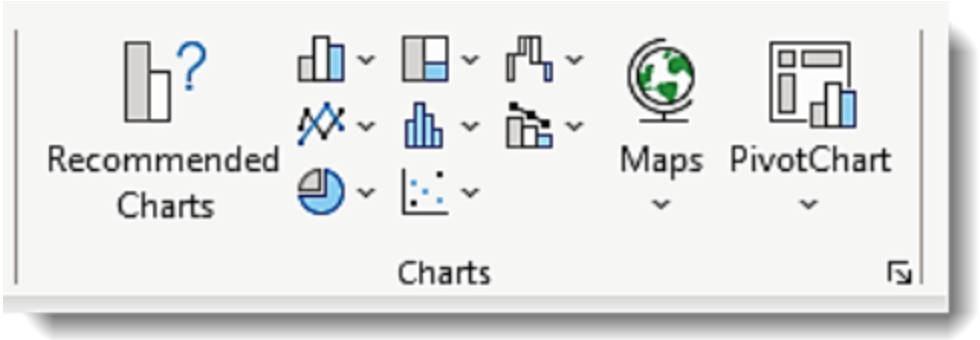
- If you need to include data from various sources or worksheets in your chart, consider using Excel's data consolidation tools to merge the data into a single selection.
- Lastly, remember that selecting the correct data is not just about including the appropriate information; it's also about excluding irrelevant data. Thoroughly review your selection to ensure that it precisely represents the data you want to visualize.

CHOOSE CHART TYPE

The "**Choose Chart Type**" feature in Excel is an essential tool for creating visually appealing and easy-to-understand charts. Once you have selected the necessary data for your chart, click the **“Insert”** tab on the ribbon and move the mouse cursor toward the “**Charts command group.**”

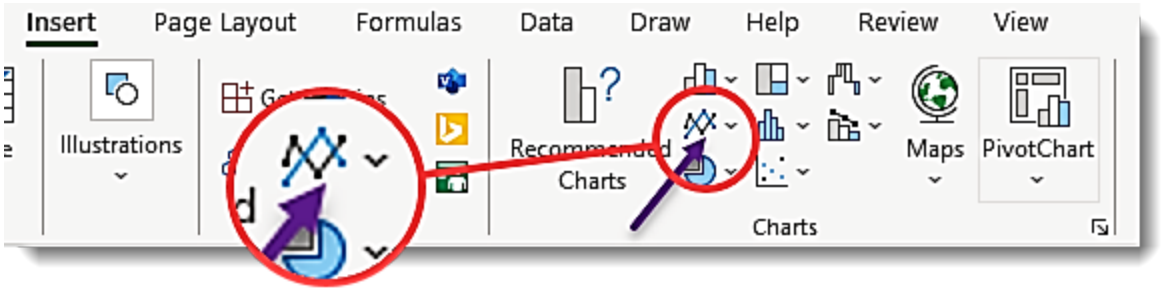


This feature allows users to select from various chart types, including line charts, bar charts, column charts, pie charts, and many more.

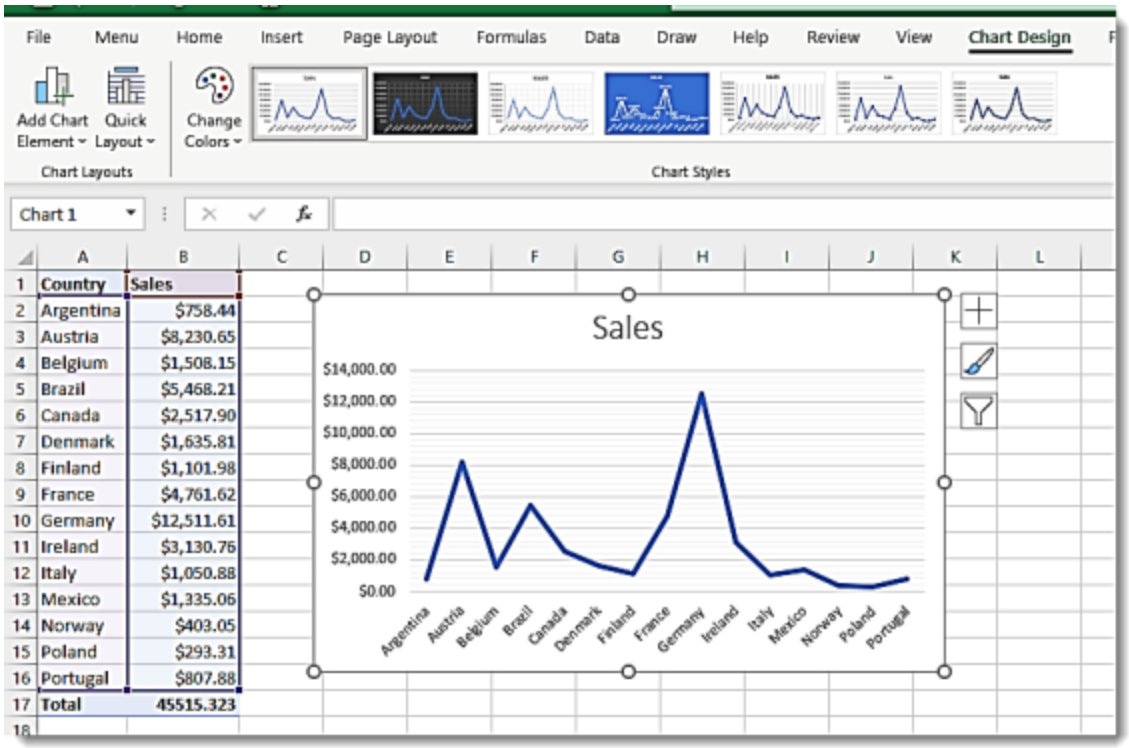


Below are some additional details about this feature:

1. **Line charts** are ideal for showing trends over time, such as Sales reports or temperature changes.

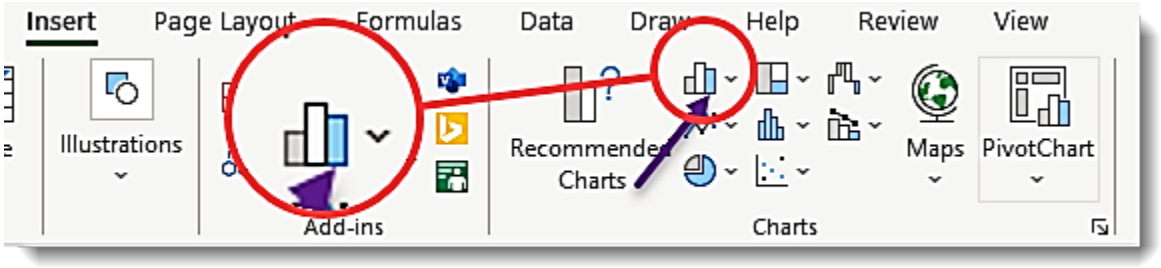


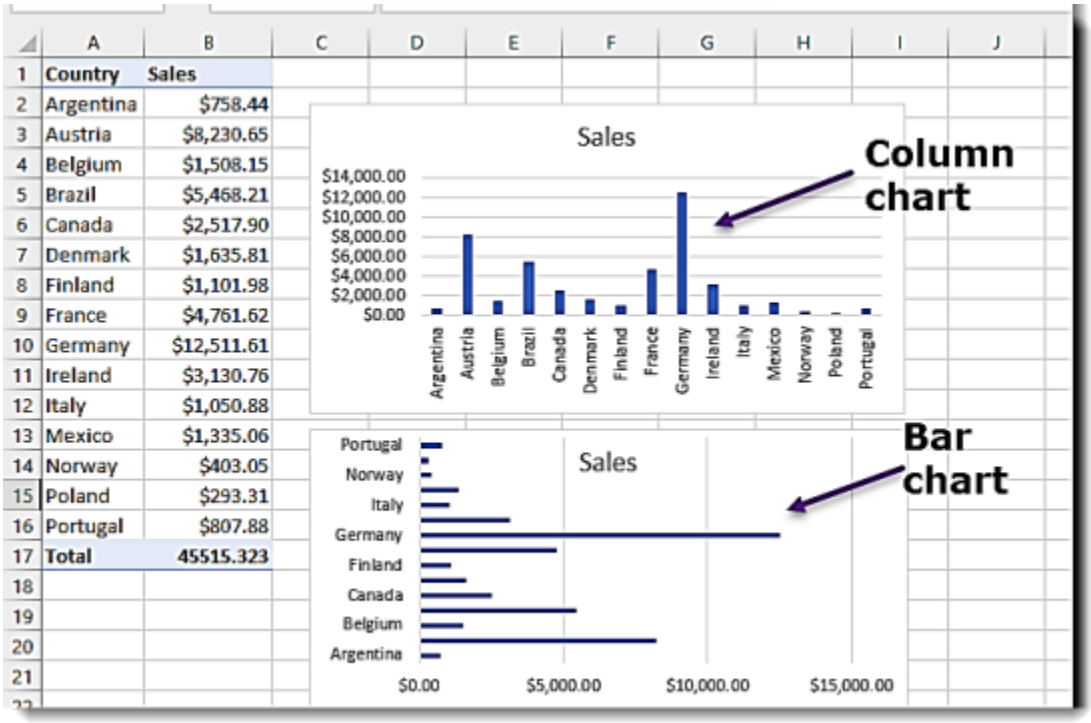
They can also be used to compare multiple sets of data over time.



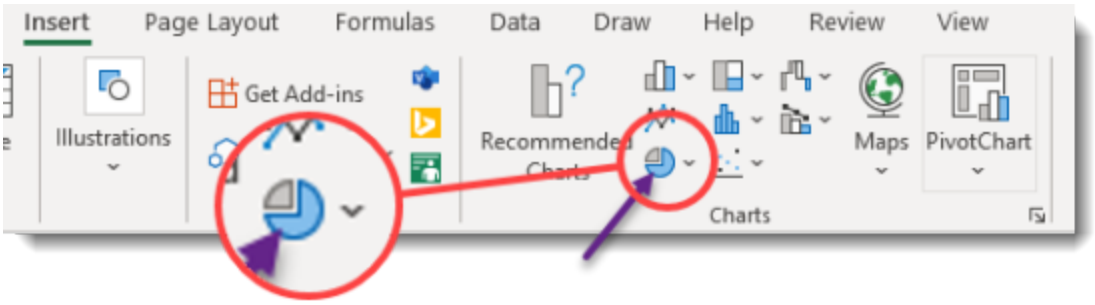
	Country	Sales
2	Argentina	$758.44
3	Austria	$8,230.65
4	Belgium	$1,508.15
5	Brazil	$5,468.21
6	Canada	$2,517.90
7	Denmark	$1,635.81
8	Finland	$1,101.98
9	France	$4,761.62
10	Germany	$12,511.61
11	Ireland	$3,130.76
12	Italy	$1,050.88
13	Mexico	$1,335.06
14	Norway	$403.05
15	Poland	$293.31
16	Portugal	$807.88
17	Total	45515.323

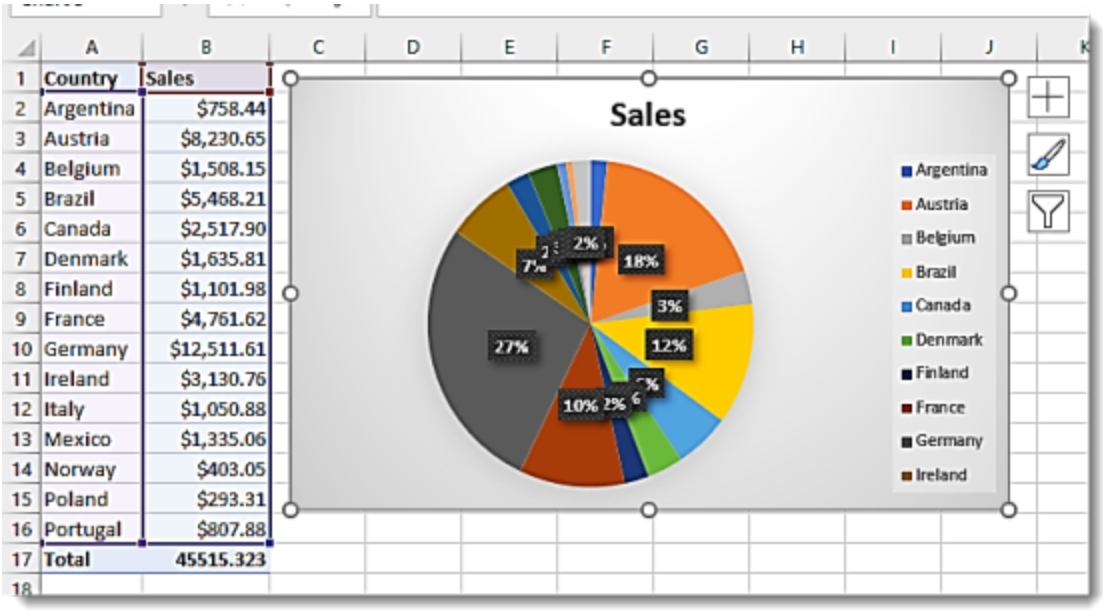
1. **Bar charts or Column charts** are similar but differ in orientation. Bar charts are horizontal, while column charts are vertical. Both are great for comparing different values in a single category, such as sales figures for different country.





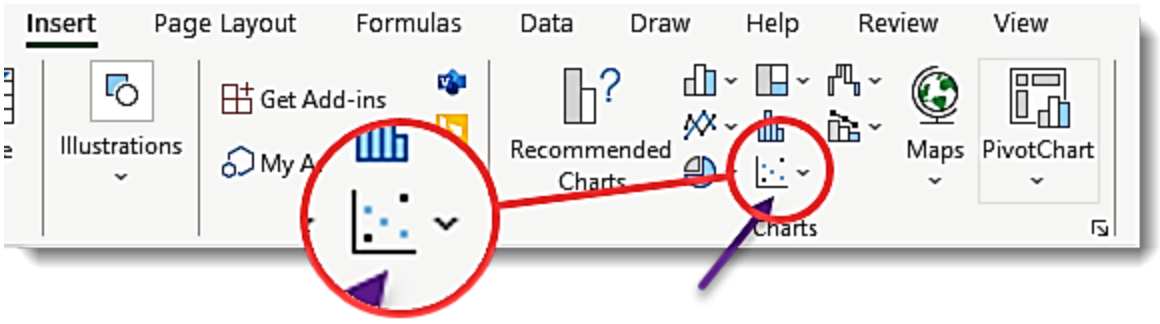
1. **Pie charts** help show the proportions of a whole. They are often used in business presentations to show market share or budget breakdowns.



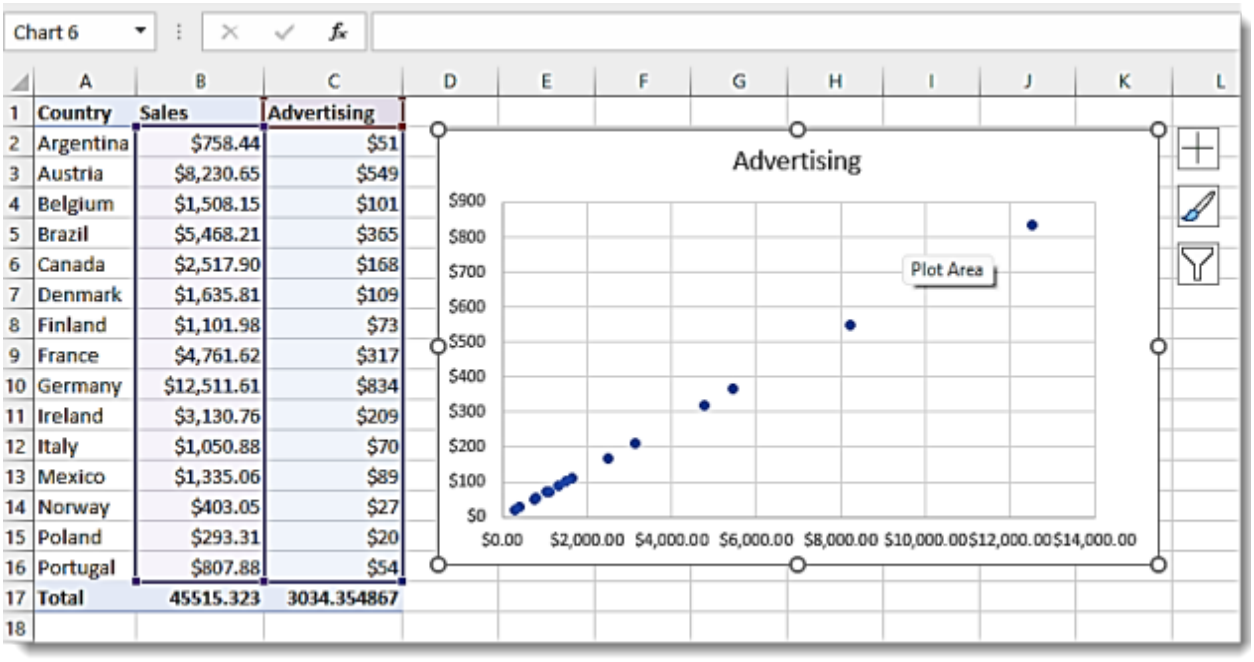


	A	B
1	Country	Sales
2	Argentina	$758.44
3	Austria	$8,230.65
4	Belgium	$1,508.15
5	Brazil	$5,468.21
6	Canada	$2,517.90
7	Denmark	$1,635.81
8	Finland	$1,101.98
9	France	$4,761.62
10	Germany	$12,511.61
11	Ireland	$3,130.76
12	Italy	$1,050.88
13	Mexico	$1,335.06
14	Norway	$403.05
15	Poland	$293.31
16	Portugal	$807.88
17	Total	45515.323

1. **Scatter charts** are used to show the relationship between two variables.

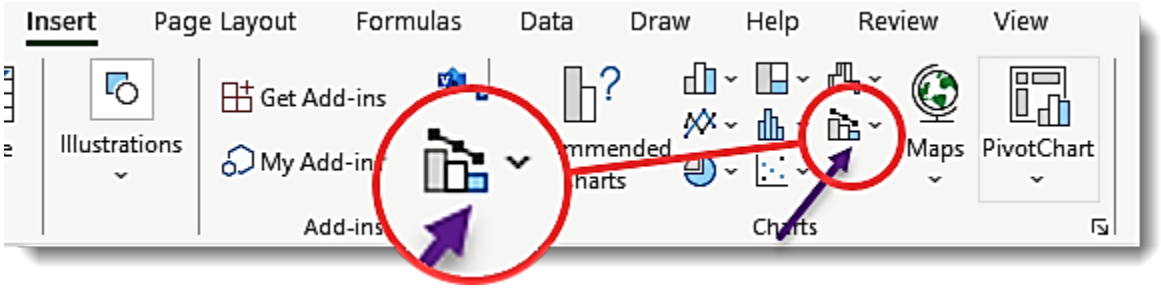


For example, a scatter chart can be used to show the correlation between Sales and Advertisement.

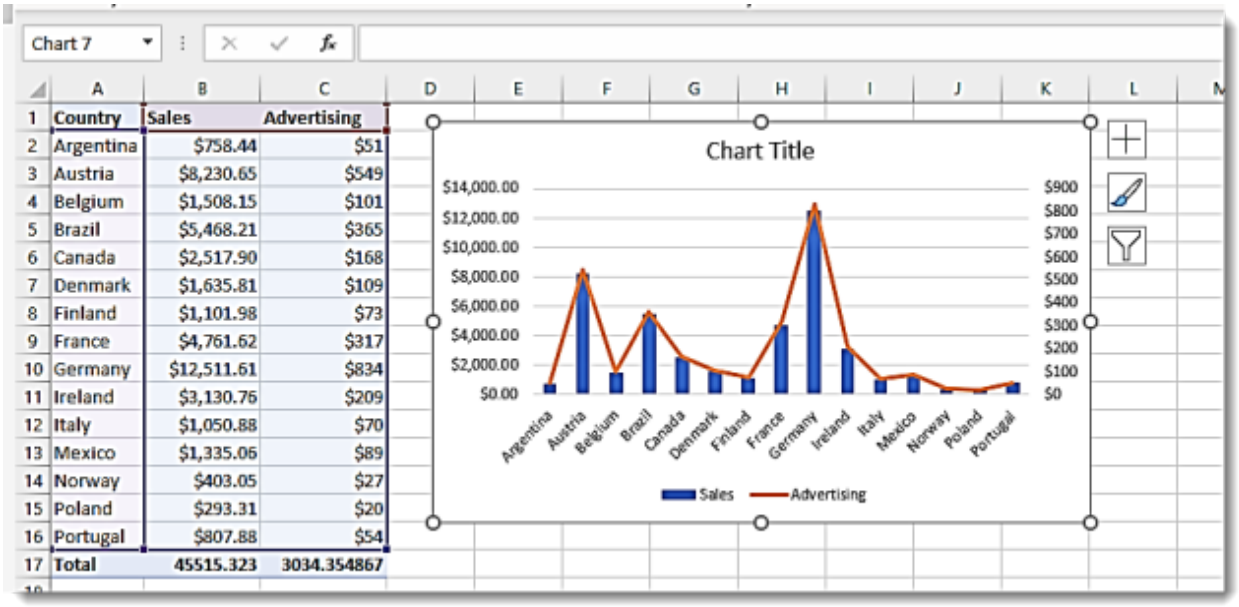


	Country	Sales	Advertising
2	Argentina	$758.44	$51
3	Austria	$8,230.65	$549
4	Belgium	$1,508.15	$101
5	Brazil	$5,468.21	$365
6	Canada	$2,517.90	$168
7	Denmark	$1,635.81	$109
8	Finland	$1,101.98	$73
9	France	$4,761.62	$317
10	Germany	$12,511.61	$834
11	Ireland	$3,130.76	$209
12	Italy	$1,050.88	$70
13	Mexico	$1,335.06	$89
14	Norway	$403.05	$27
15	Poland	$293.31	$20
16	Portugal	$807.88	$54
17	Total	45515.323	3034.354867

1. **Combo charts** are useful for showing different types of data on the same chart.



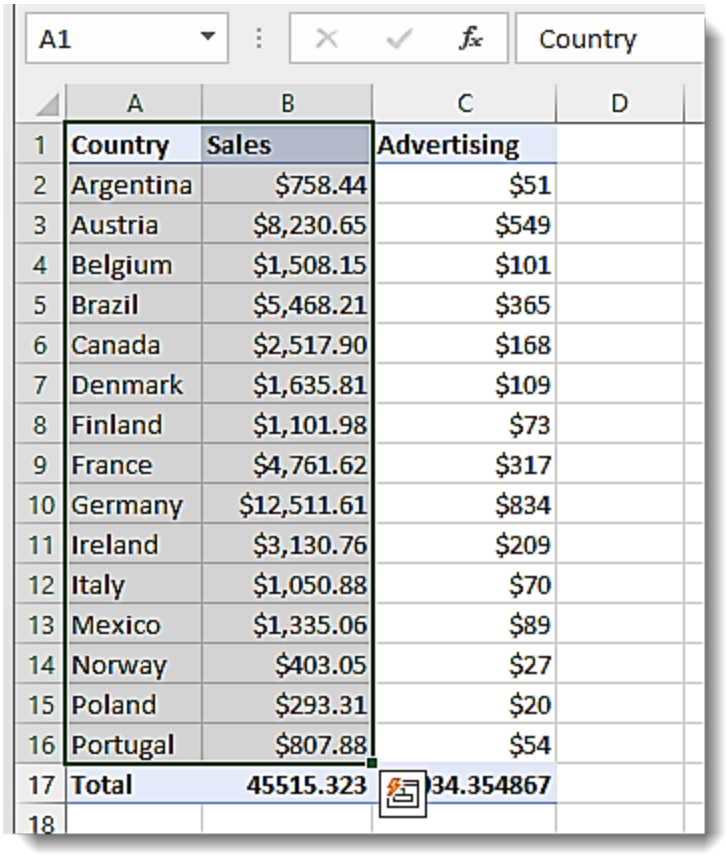
For example, a combo chart can show a line and bar chart on the same axis.



	A	B	C
1	**Country**	**Sales**	**Advertising**
2	Argentina	$758.44	$51
3	Austria	$8,230.65	$549
4	Belgium	$1,508.15	$101
5	Brazil	$5,468.21	$365
6	Canada	$2,517.90	$168
7	Denmark	$1,635.81	$109
8	Finland	$1,101.98	$73
9	France	$4,761.62	$317
10	Germany	$12,511.61	$834
11	Ireland	$3,130.76	$209
12	Italy	$1,050.88	$70
13	Mexico	$1,335.06	$89
14	Norway	$403.05	$27
15	Poland	$293.31	$20
16	Portugal	$807.88	$54
17	**Total**	**45515.323**	**3034.354867**

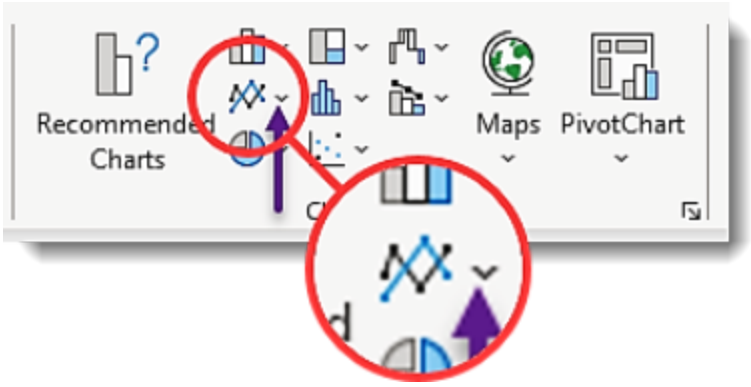
CREATE A SIMPLE LINE CHART

1. To create a Line chart, start by selecting the data you want to present, which can range from **Country** to **Sales**, as illustrated below. Cell range A1:B16 is selected.

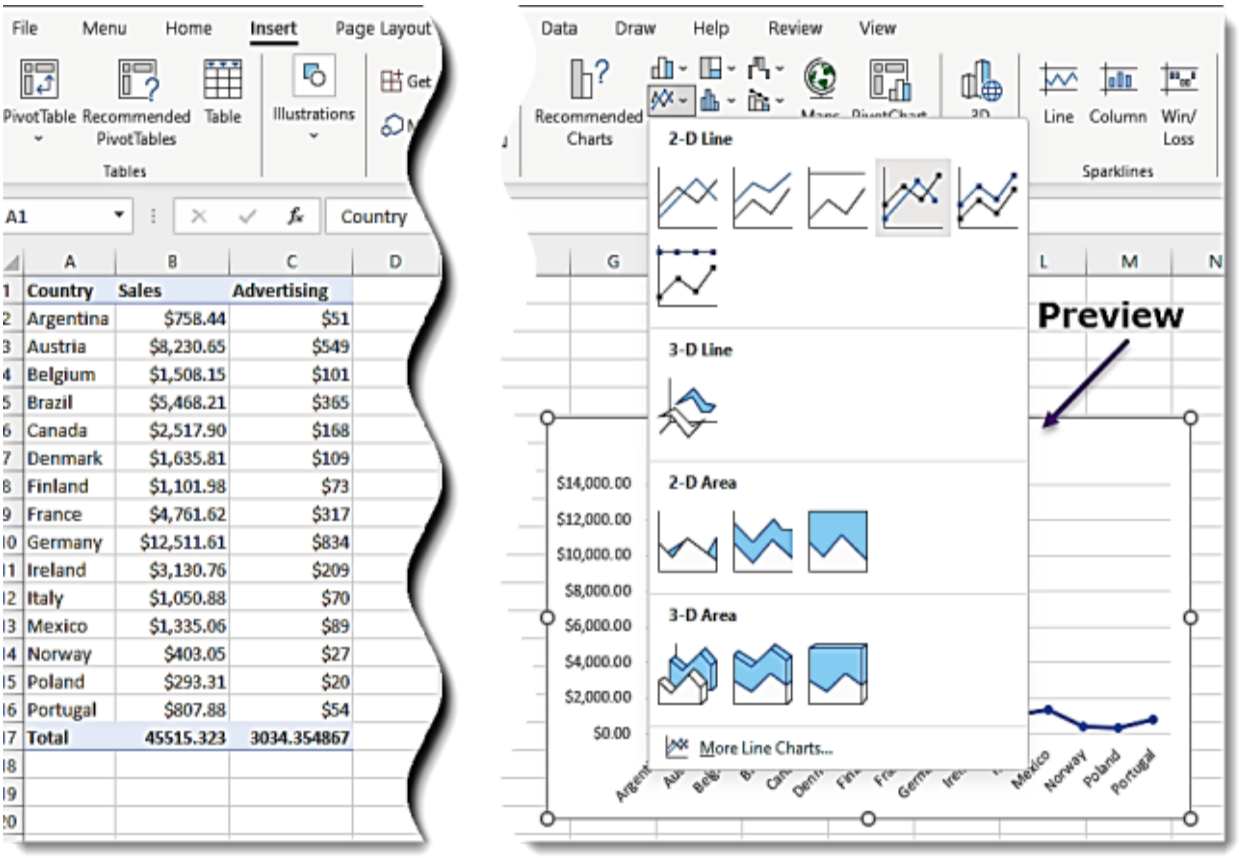


	A	B	C	D
1	**Country**	**Sales**	**Advertising**	
2	Argentina	$758.44	$51	
3	Austria	$8,230.65	$549	
4	Belgium	$1,508.15	$101	
5	Brazil	$5,468.21	$365	
6	Canada	$2,517.90	$168	
7	Denmark	$1,635.81	$109	
8	Finland	$1,101.98	$73	
9	France	$4,761.62	$317	
10	Germany	$12,511.61	$834	
11	Ireland	$3,130.76	$209	
12	Italy	$1,050.88	$70	
13	Mexico	$1,335.06	$89	
14	Norway	$403.05	$27	
15	Poland	$293.31	$20	
16	Portugal	$807.88	$54	
17	**Total**	**45515.323**	**34.354867**	
18				

1. On the **Insert** tab, under the **Charts** group, click the arrow beside the Line symbol to select a suitable Line chat.

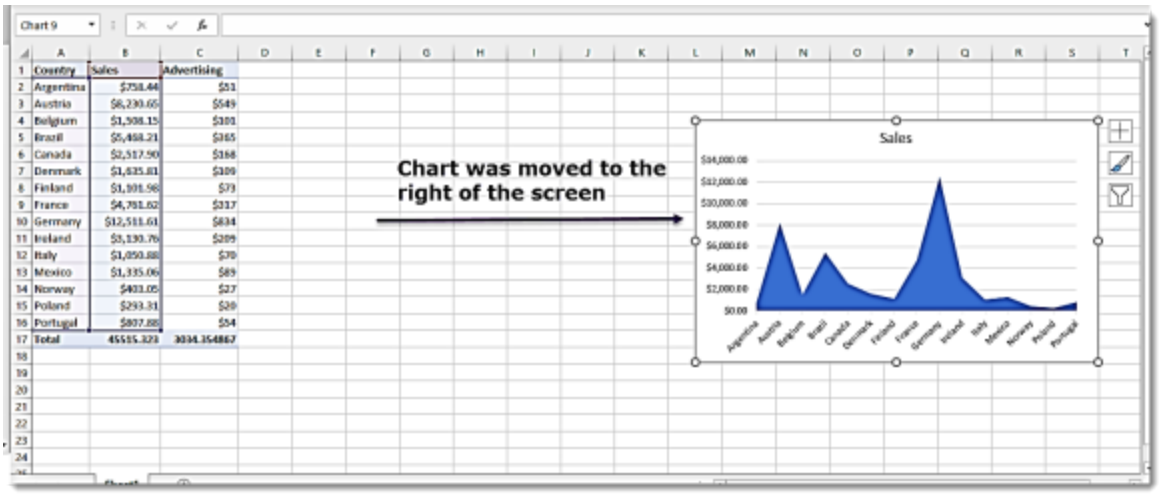


Select **Line with Markers** under the **2-D Line** category from the available options. Excel also previews what the Chart will look like before you finally click on your choice.

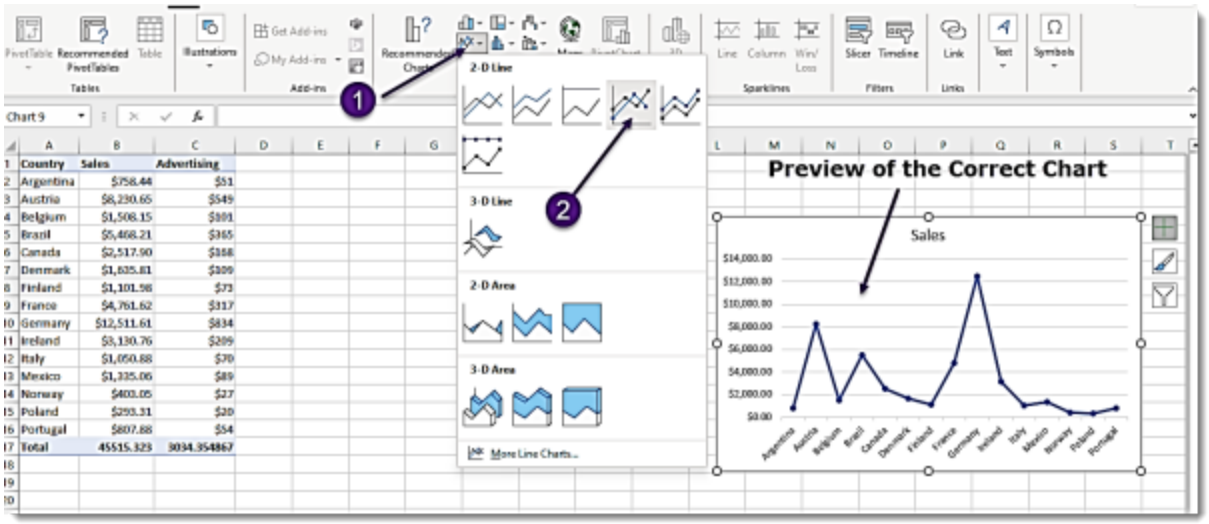


	Country	Sales	Advertising
2	Argentina	$758.44	$51
3	Austria	$8,230.65	$549
4	Belgium	$1,508.15	$101
5	Brazil	$5,468.21	$365
6	Canada	$2,517.90	$168
7	Denmark	$1,635.81	$109
8	Finland	$1,101.98	$73
9	France	$4,761.62	$317
10	Germany	$12,511.61	$834
11	Ireland	$3,130.76	$209
12	Italy	$1,050.88	$70
13	Mexico	$1,335.06	$89
14	Norway	$403.05	$27
15	Poland	$293.31	$20
16	Portugal	$807.88	$54
17	Total	45515.323	3034.354867

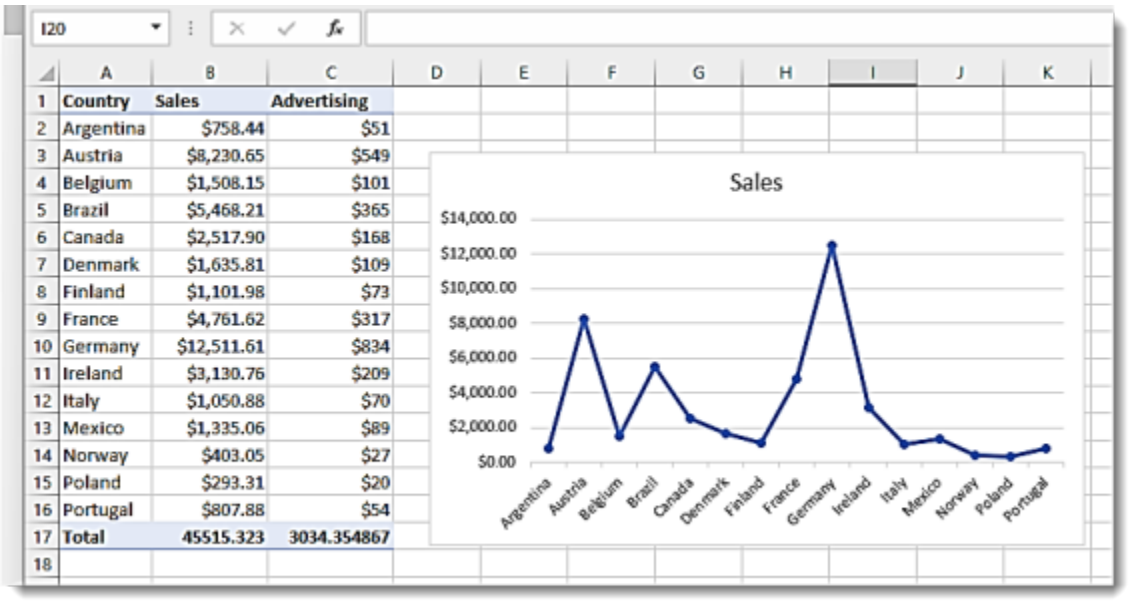
You don't need to delete a Chart if you mistakenly select the wrong one. Click and drag the Chart to your screen's side for a better Preview.



You click on the outer border, return to the **Insert** tab, and repeat the process.



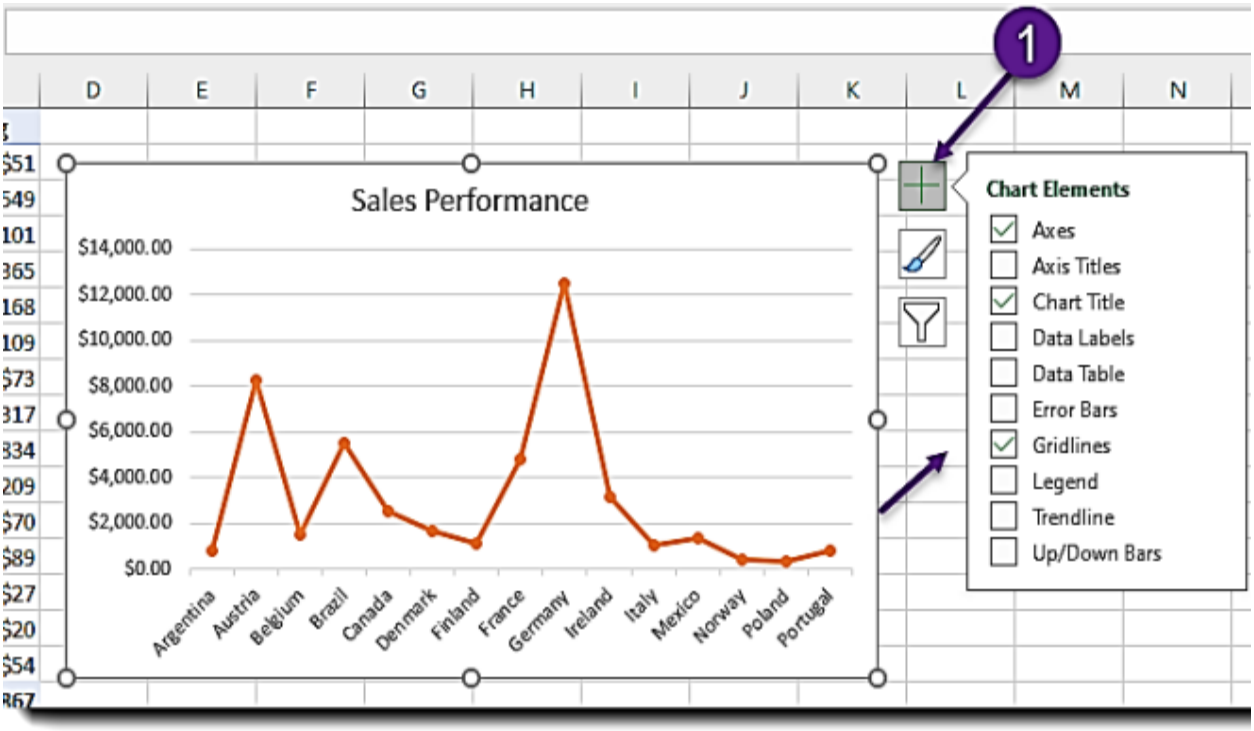
When done, you can click and drag the Chart to the location where you want it to be on your worksheet.



	A	B	C
1	**Country**	**Sales**	**Advertising**
2	Argentina	$758.44	$51
3	Austria	$8,230.65	$549
4	Belgium	$1,508.15	$101
5	Brazil	$5,468.21	$365
6	Canada	$2,517.90	$168
7	Denmark	$1,635.81	$109
8	Finland	$1,101.98	$73
9	France	$4,761.62	$317
10	Germany	$12,511.61	$834
11	Ireland	$3,130.76	$209
12	Italy	$1,050.88	$70
13	Mexico	$1,335.06	$89
14	Norway	$403.05	$27
15	Poland	$293.31	$20
16	Portugal	$807.88	$54
17	**Total**	**45515.323**	**3034.354867**
18			

CHART ELEMENTS

A dedicated button in Excel for Chart Elements allows you to enhance the visual representation of your data. This button only appears when you click on a chart and appears amongst the Chart Tools ribbon. When clicked, it opens a drop-down menu presenting various chart elements that can be added or removed.



When you click on the Chart Elements button, you can access various chart elements that can be added to your chart.

These elements include

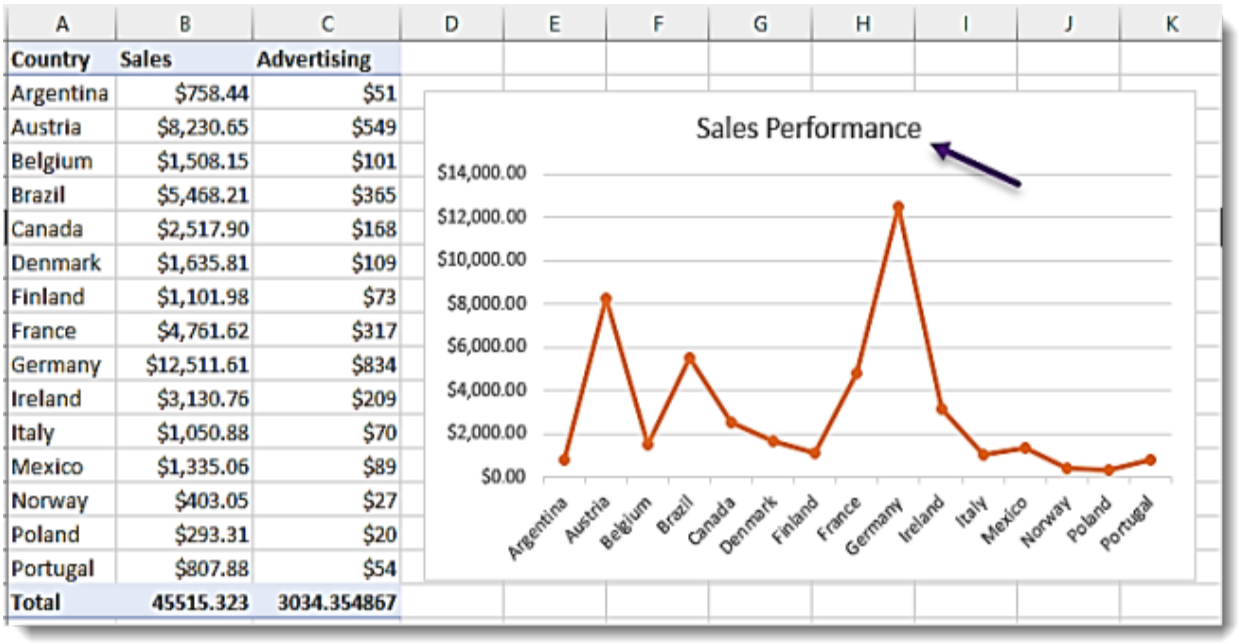
- axis titles
- data labels,

- gridlines,
- a legend with color-coded keys,
- error bars, and
- trendlines.

Adding these elements to your chart can provide more context to your data, highlight trends and patterns, and improve the overall readability of your chart.

CHART TITLES

When creating a chart in Excel, there are some key things you must know about to make it look legit. First, give that chart a **TITLE** so anyone can understand what it's all about. For example, in the illustration below, **SALES PERFORMANCE** is the Chart title.



Country	Sales	Advertising
Argentina	$758.44	$51
Austria	$8,230.65	$549
Belgium	$1,508.15	$101
Brazil	$5,468.21	$365
Canada	$2,517.90	$168
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Italy	$1,050.88	$70
Mexico	$1,335.06	$89
Norway	$403.05	$27
Poland	$293.31	$20
Portugal	$807.88	$54
Total	**45515.323**	**3034.354867**

If you don’t have the Title enabled, click on the Chat Elements button and click on the check box to enable it.

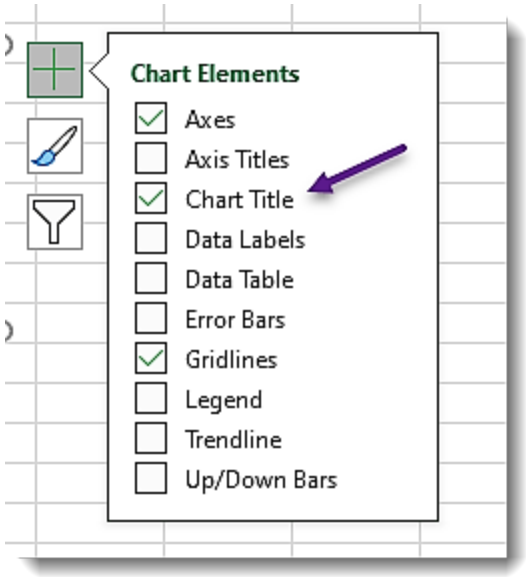


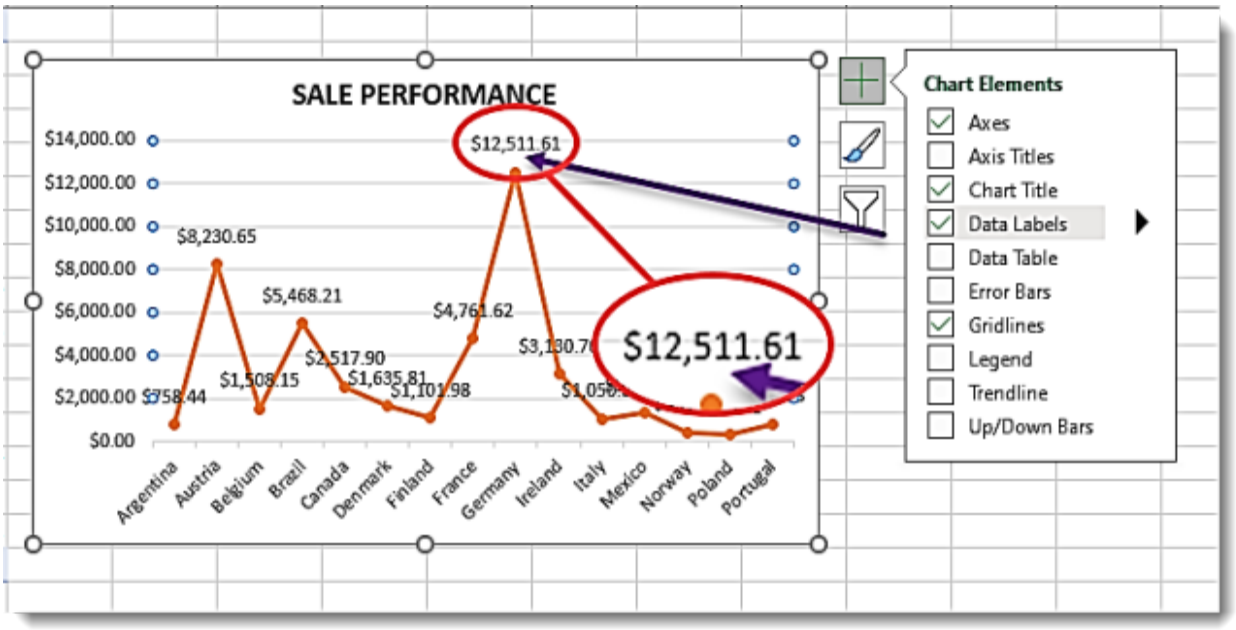
Chart Elements
Axes
Axis Titles
Chart Title
Data Labels
Data Table
Error Bars
Gridlines
Legend
Trendline
Up/Down Bars

LABELS

Labels are essential, so you can tell what's happening in the chart.

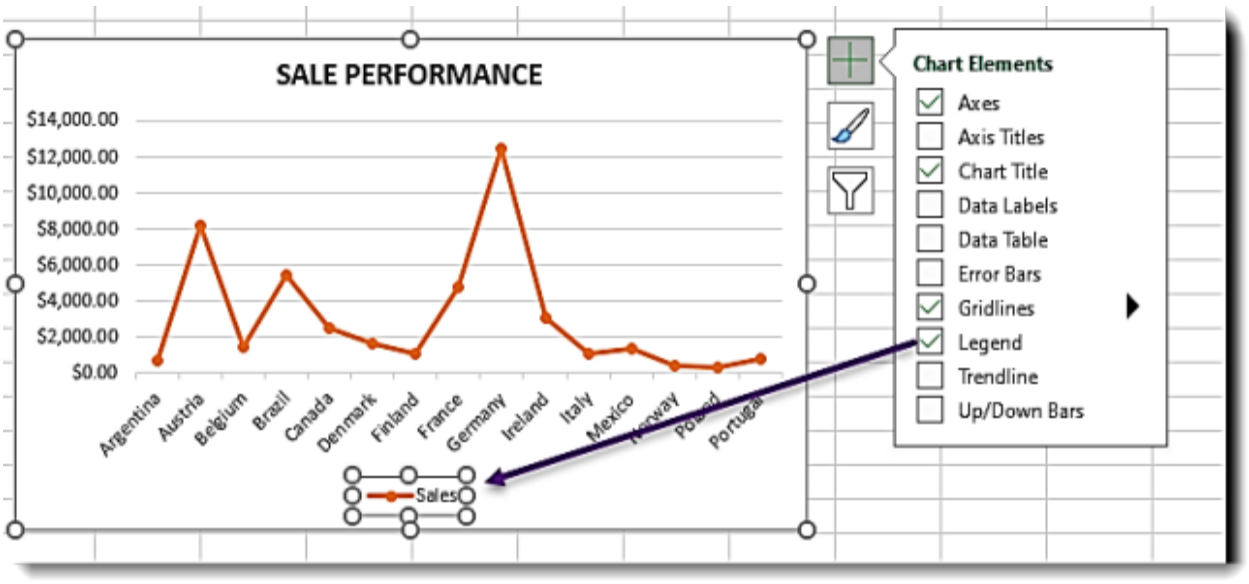
Axis labels help you see the scale and units you are using.

Data labels, on the other hand, show you the actual values for each point on the chart.



LEGENDS

Legends are another features you can use to help anyone understand viewing your chart. You can assign colors or symbols to data series, so people can see what is what and compare things more easily.



GRIDLINES

Gridlines are also helpful in helping anyone read the chart and accurately judge the values.

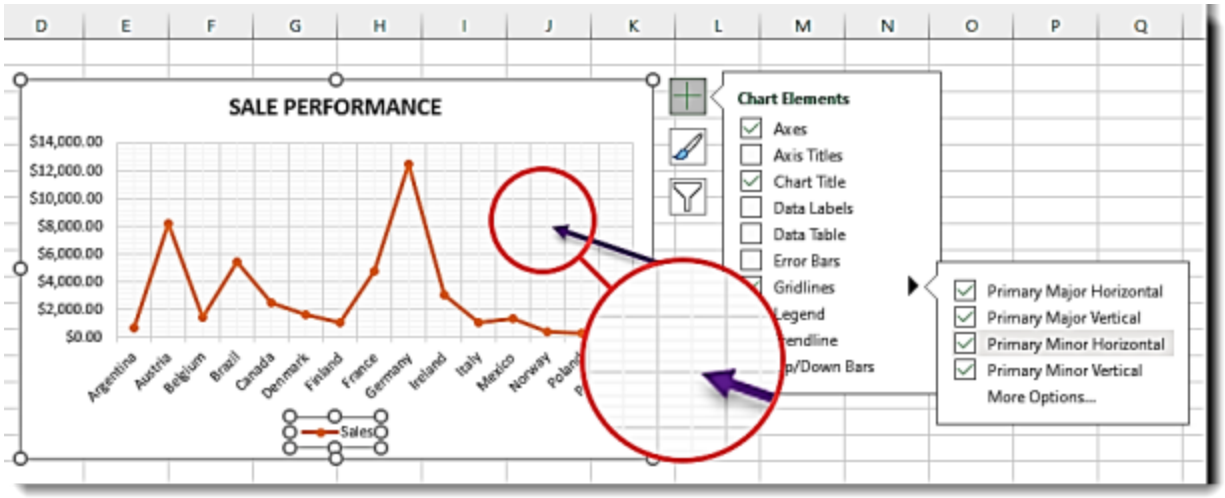
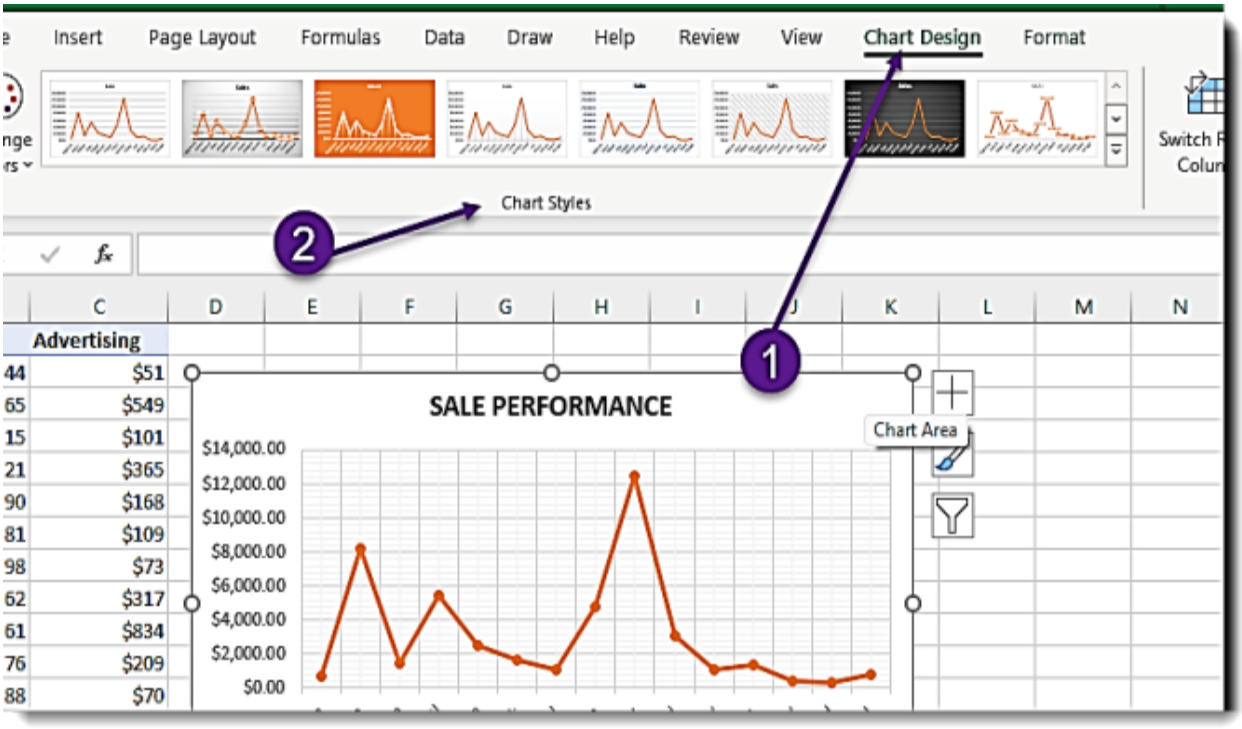


CHART STYLES AND FILTER

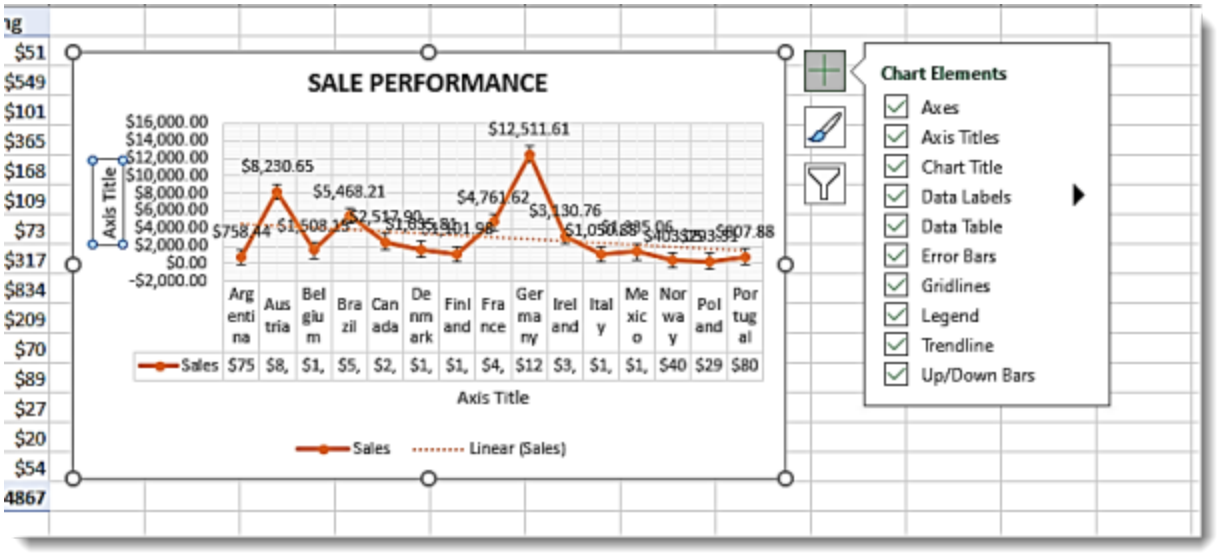
Excel also has many different chart styles you can choose from to customize the look of your chart. The **Chart Style** can be accessed when you click on an existing Chart on your worksheet. The Chart Design tab on the ribbon is where you click on to view the Chart Sytle in the Style Group.



You can change colors, fonts, and shapes to make your chart look presentable.

However, you have to be careful not to go overboard with all these chart elements.

If you use too many of the chart elements, your chart can look cluttered and confusing.

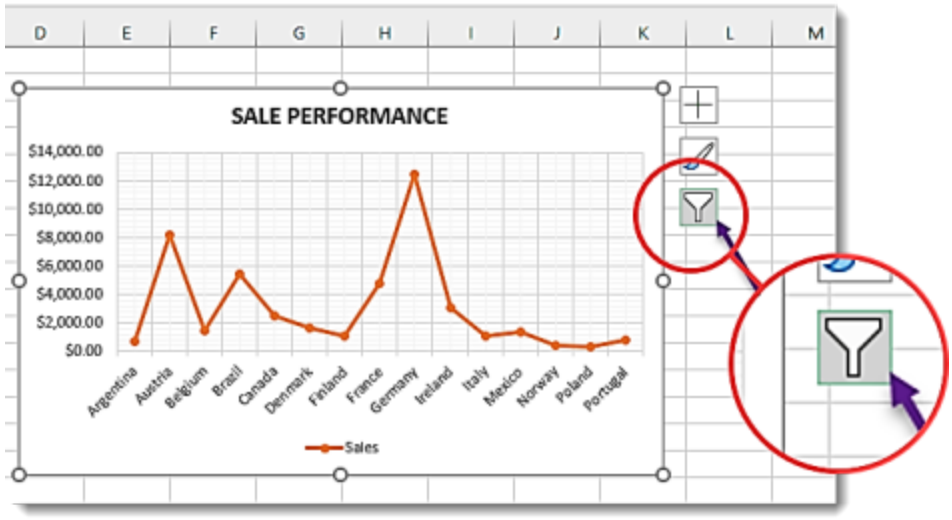


You have to think about which chart elements you really need and how to use them effectively to make a clear and informative chart.

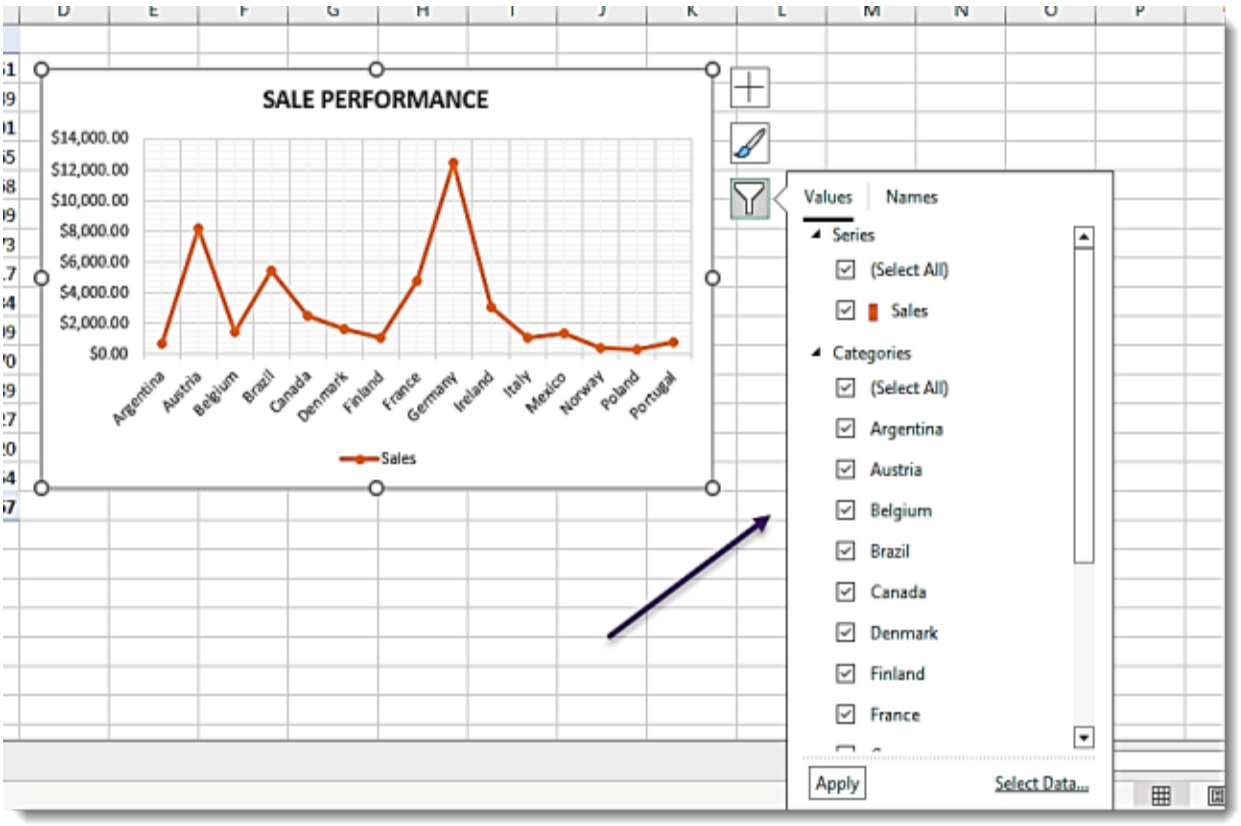
Chart Filters

Chart Filters are Excel features that allow you to exclude specific data elements from a chart. This means that you can choose which data to display and which to hide in your chart. This is really helpful when you have a large amount of data but simply wish to display specific information.

First, you choose the chart that you want to filter. Then, click the "**Filter**" icon that appears next to the chart.

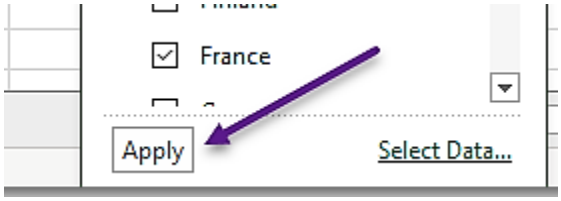


This will pop up the **Chart Filters menu**.



From here, you can select which data to display or hide by simply ticking or unticking the boxes beside the relevant data series.

When done, click the **Apply** button to apply the updates on the chart.



CUSTOMIZE CHART

Excel has tools that allow you to create and customize data visualizations powerfully. With its intuitive interface and comprehensive features, you can easily create stunning, highly informative charts to help you make informed decisions.

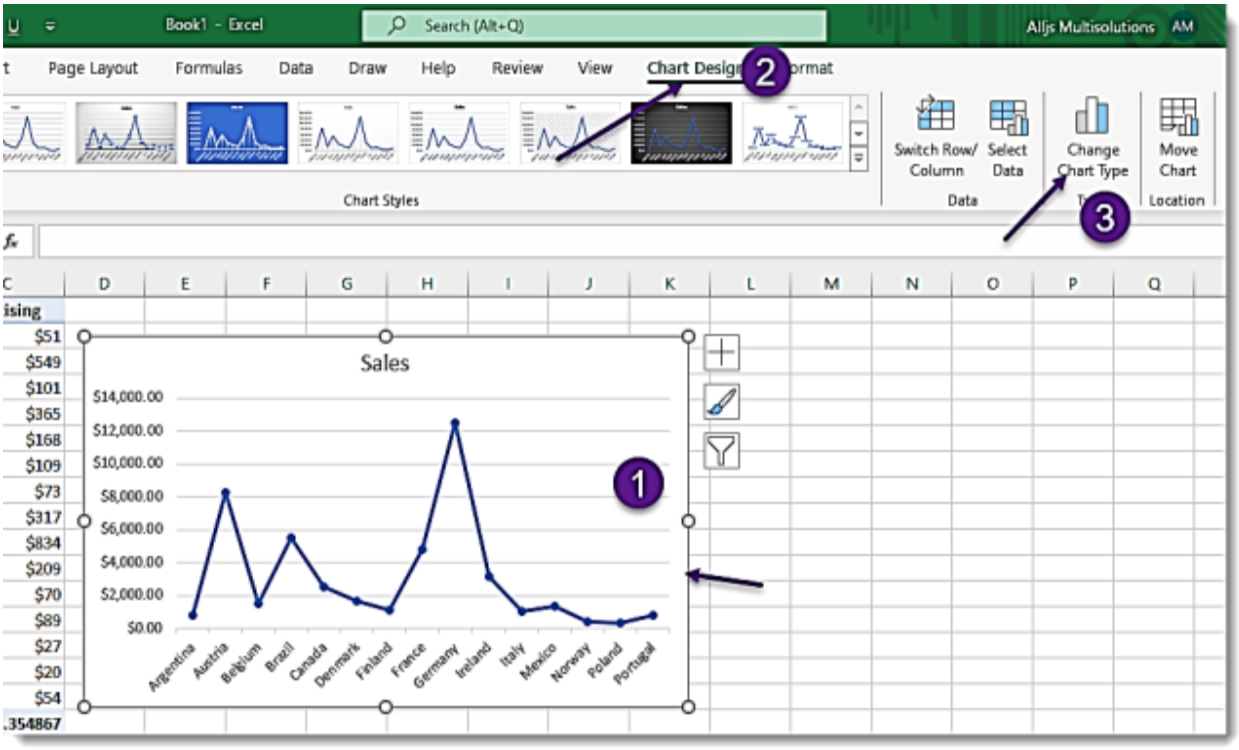
Here are just a few of the ways that you can customize your charts in Excel:

HOW TO CHANGE THE CHART TYPE

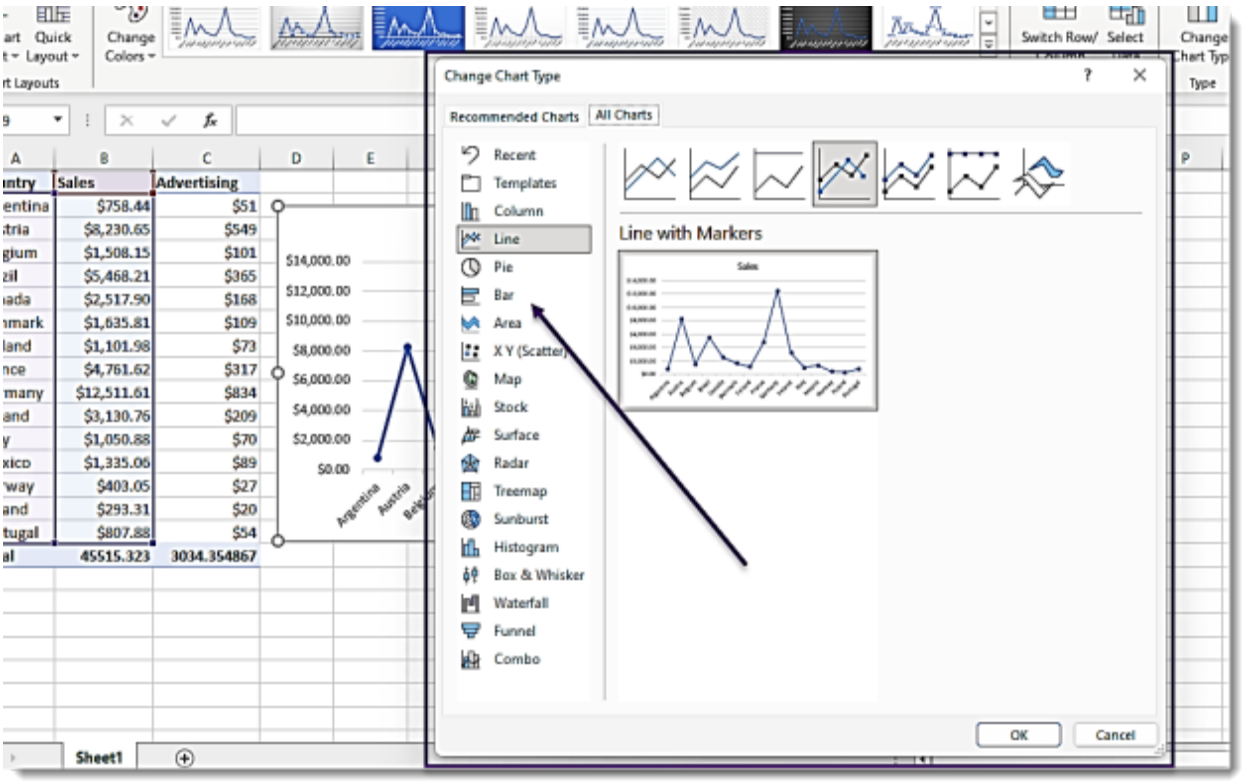
You will need to start with the basics first. Check to see what chart you use: a line, bar, or pie chart. Every type of charts created in Excel has its own pros and cons, so picking the right one for the data you want to show is important.

For example, a line chart is an excellent option to show how a particular variable changes over time. On the other hand, if you intend to compare the sizes of different categories, a bar chart might be more suitable.

So, if you have created a Line chart but want to change it to a Bar chart, don't worry; it's a simple process. In Excel, you only need to select the chart, click on the **Chart Design** tab, and then click on **Change Chart Type** icon.

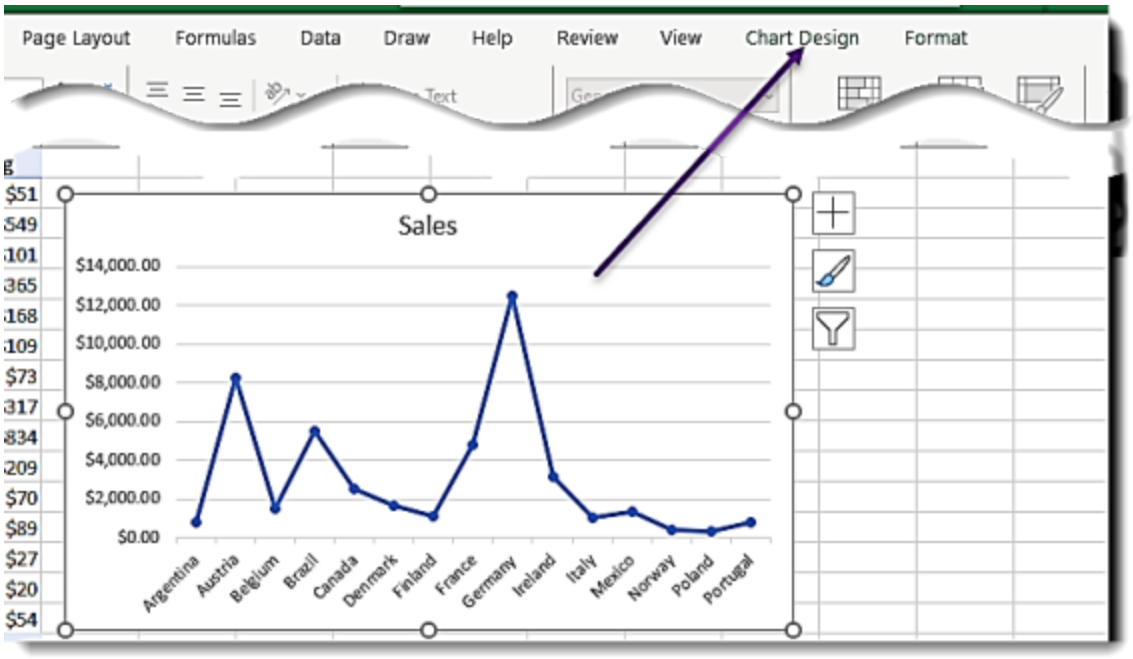


From the **Change Chart Type** dialog box, you can comfortably choose the new chart type you want to use.

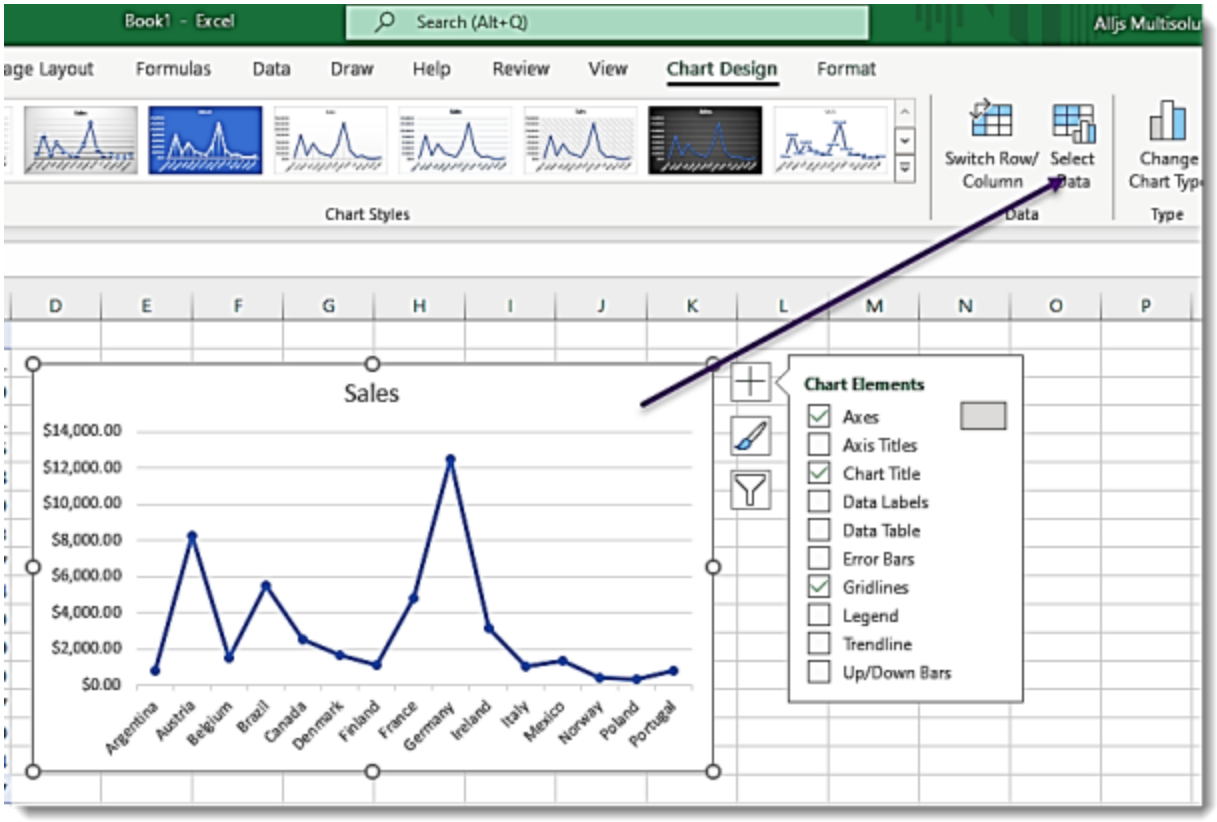

Change Chart Type
Recommended Charts
All Charts
Recent
Templates
Column
Line
Pie
Bar
Area
X Y (Scatter)
Map
Stock
Surface
Radar
Treemap
Sunburst
Histogram
Box & Whisker
Waterfall
Funnel
Combo
Line with Markers
OK
Cancel
Sheet1
Sales
Advertising
$14,000.00
$12,000.00
$10,000.00
$8,000.00
$6,000.00
$4,000.00
$2,000.00
$0.00
Argentina
Austria

HOW TO CHANGE THE CHART DATA

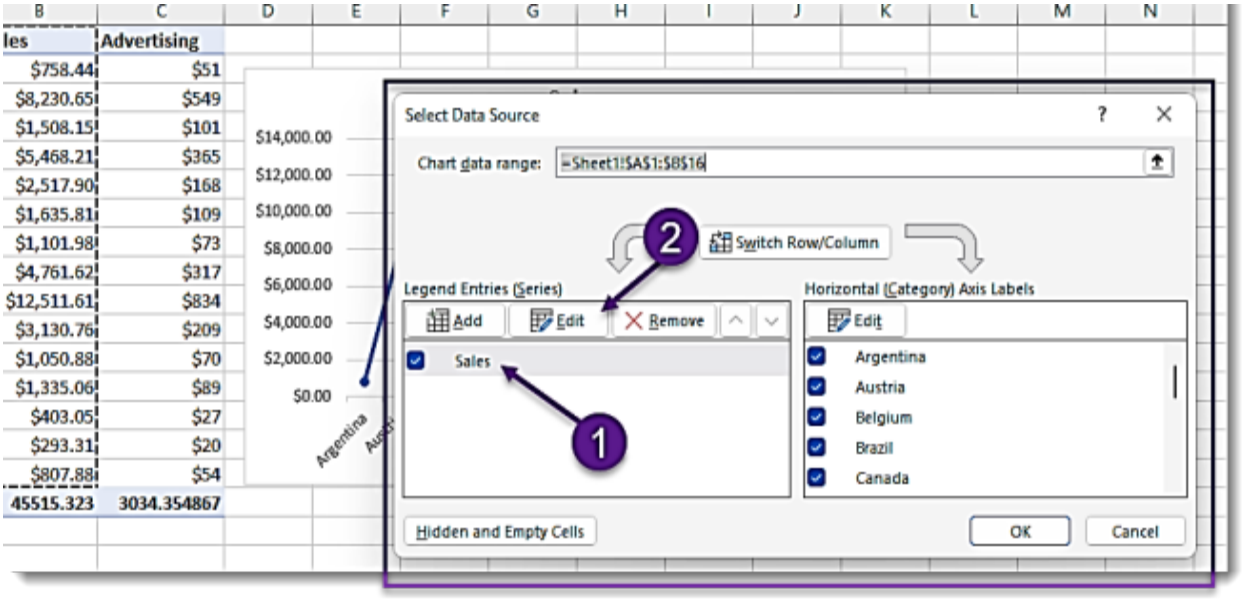
To change the data used in creating a chart on your worksheet, you first select the chart that you want to modify. Then, click on the **Chart Design** tab.



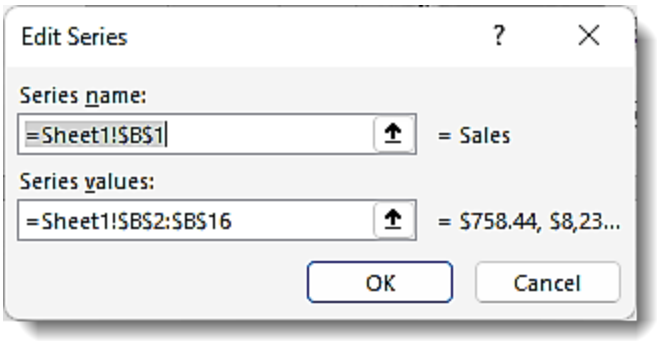
Once you are in the **Chart Design** tab, click on the **Select Data** button under the **Type** Group.



The **Select Data Source** dialog box will appear with a table showing the data currently used to create the chart. To make any changes to the data, click on the "**Edit**" button next to the "**Legend Entries (Series)**" or "**Horizontal (Category) Axis Labels**" sections.



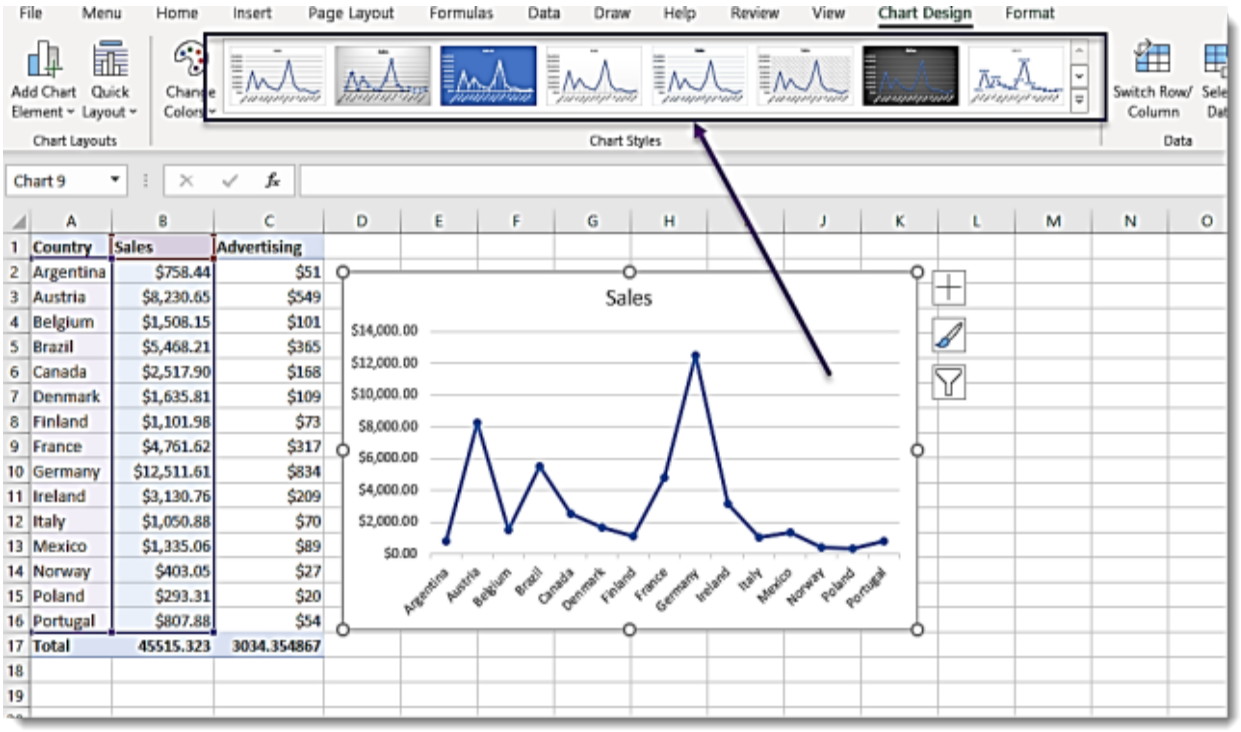
Then you can choose the range of data you want to use.



Once you have made your changes, click "**OK** " to update the new information.

HOW TO CHANGE THE CHART STYLE

1. First, select the existing chart you want to change on your worksheet by clicking on it.
2. Next, go to the **Chart Design** tab on the Excel ribbon.
3. Under the **Chat Style** group, you will see a preview of different chart styles.



	A	B	C
1	Country	Sales	Advertising
2	Argentina	$758.44	$51
3	Austria	$8,230.65	$549
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5	Brazil	$5,468.21	$365
6	Canada	$2,517.90	$168
7	Denmark	$1,635.81	$109
8	Finland	$1,101.98	$73
9	France	$4,761.62	$317
10	Germany	$12,511.61	$834
11	Ireland	$3,130.76	$209
12	Italy	$1,050.88	$70
13	Mexico	$1,335.06	$89
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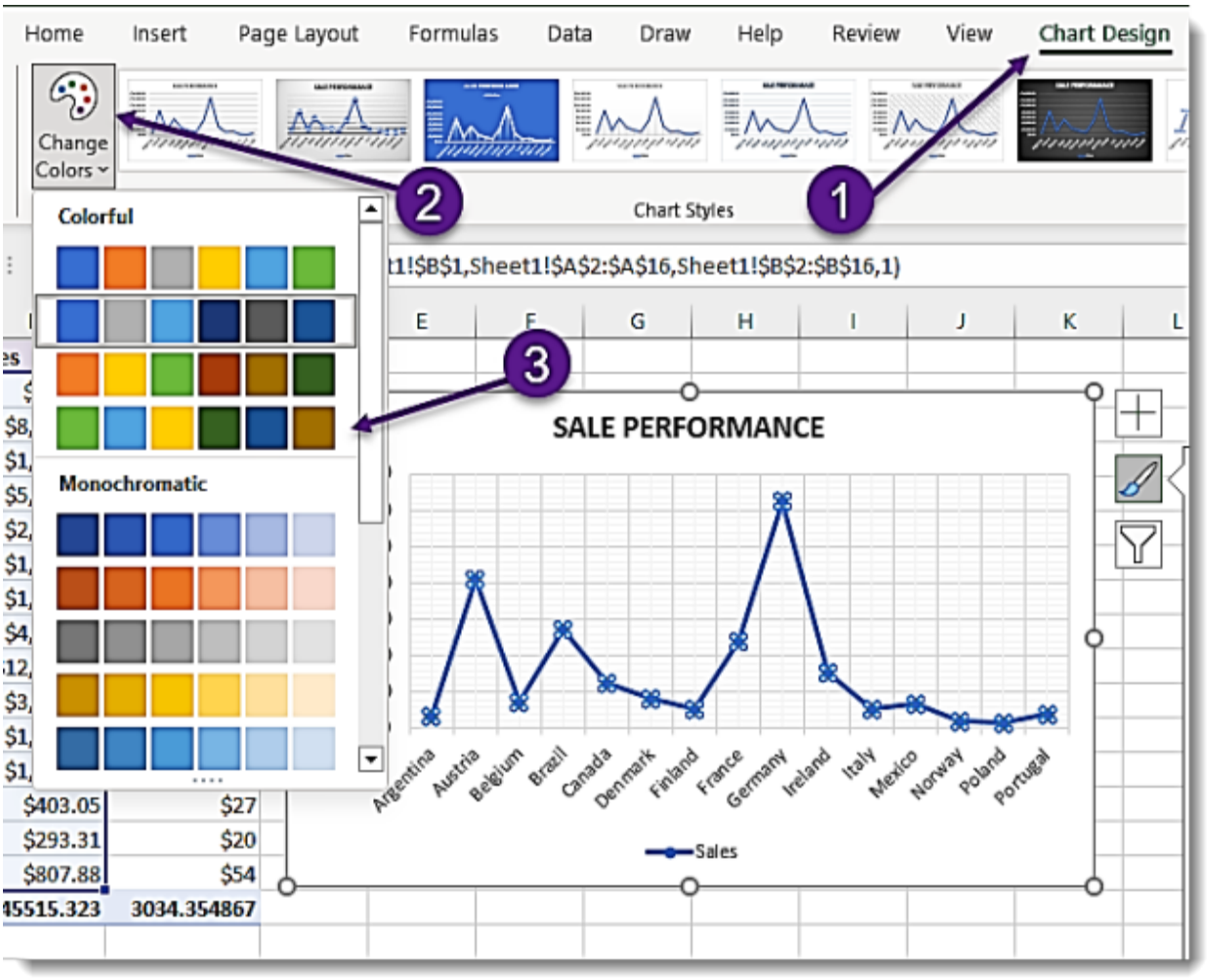
15	Poland	$293.31	$20
16	Portugal	$807.88	$54
17	Total	45515.323	3034.354867
18			
19			

You can hover over each one to see a preview of what it will look like before clicking on the one you like most.

HOW TO CHANGE THE CHART STYLE COLOR

Excel comes with its default color for charts but can be changed to suit your presentation style. To do so, start by selecting the chart you wish to modify. Click on the **Chart Design** tab on the ribbon, and then click on the **Change Color** icon.



Fro the list of colors displayed, choose the color you want, and your chart style will be updated with the new color.

LESSON 12

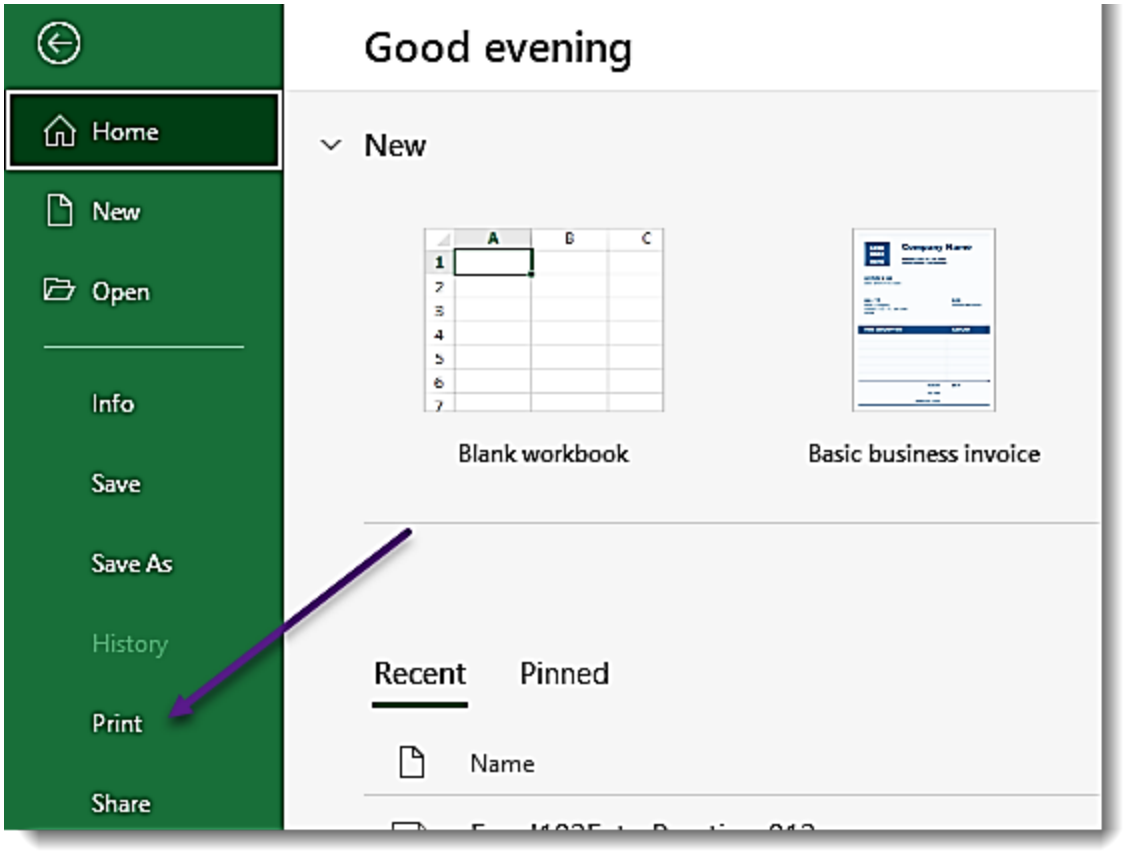
INTRODUCTION TO PRINTING IN EXCEL

Printing in Excel can be a frustrating experience, but it doesn't have to be. With the right approach and a few helpful tips, you can ensure that your Excel data looks as good on paper as on screen.

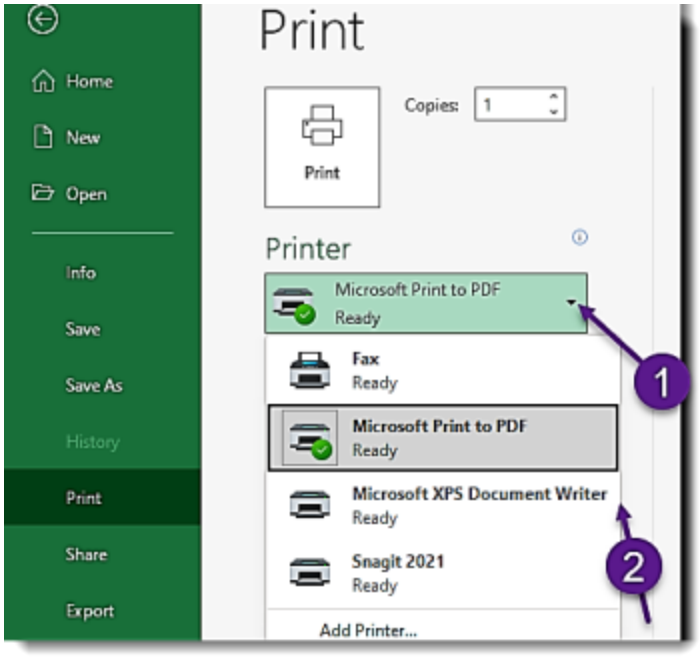
Think of Excel as a canvas and your data as the paint. You can create beautiful and complex images with Excel, but if you don't know how to print them correctly, you will never be able to get a hard copy.

Excel offers a range of printing options, from basic print settings to more advanced options that enable you to customize the appearance of your printed documents.

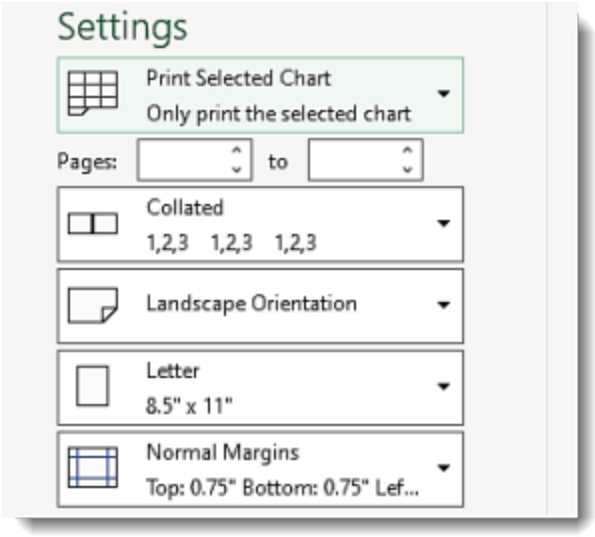
To access the printing options in Excel, navigate to the File tab and select **Print**.



Next, click the arrow under the **Printer** section to select the printer you want to use from various options.



Depending on the version of Excel you are using. You need to carry out basic settings, such as the number of copies to print, the paper size you want to print on, which pages to print, and the orientation of the printed document.



In addition to these basic settings, Excel offers more advanced printing options that allow you to customize the appearance of your printed documents.

For example, you can adjust the scaling of the document you want to print to fit more data onto a single page or print only specific parts of your Excel worksheet, such as selected rows or columns. Another advanced printing option in Excel is adding **Headers and Footers** to the sheet you want to print. These features allow you to add important information, such as page numbers, dates, and titles, to the sheet, making it more professional and easier to navigate.

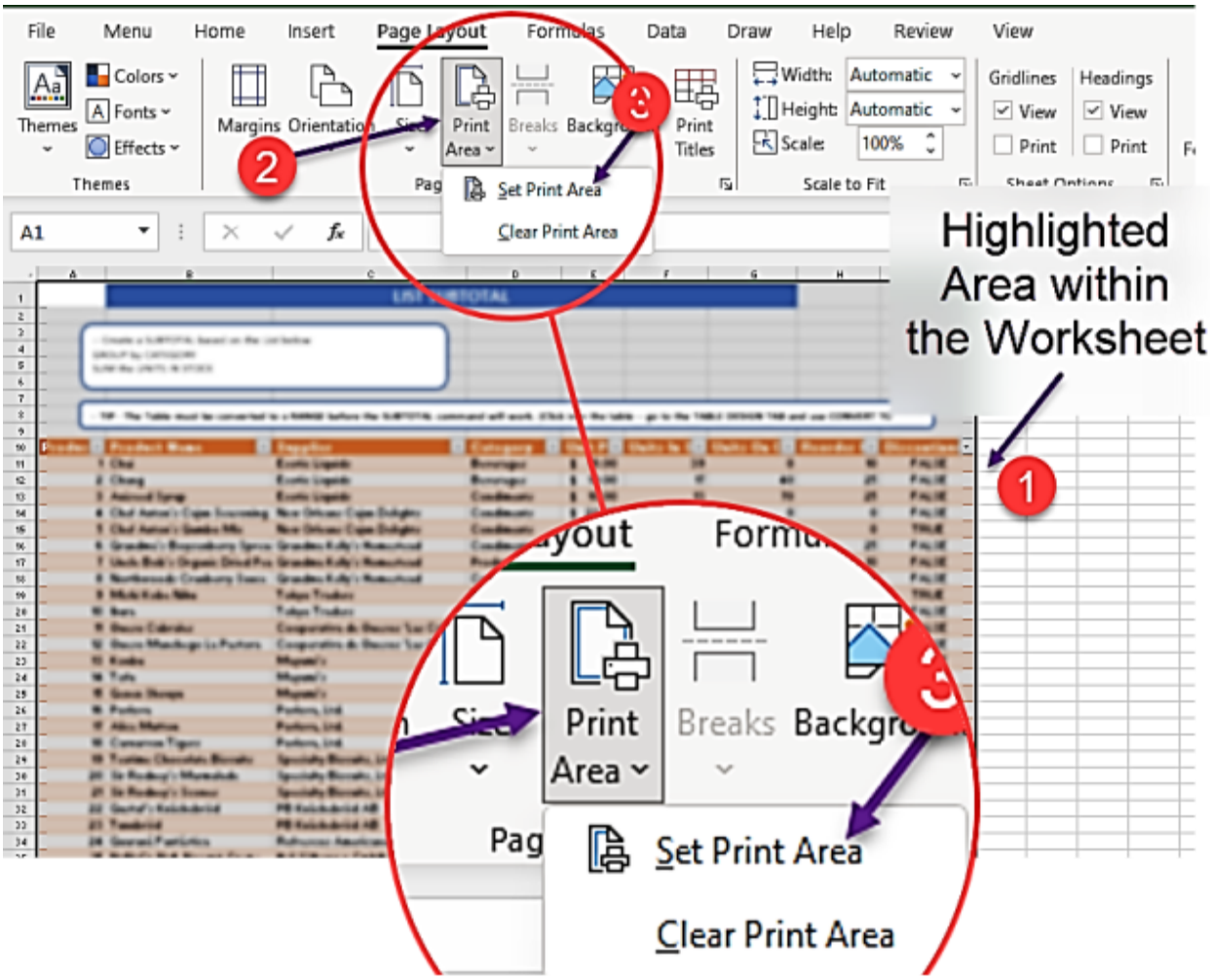
PRINT AREA

Printing a worksheet as a beginner can result in wasting paper and ink when printing your Excel worksheets. To save time and resources while still achieving the desired printout requires learning about the **Print Area** feature in Excel.

I would like you to view the **Print Area** as a virtual fence you can use to enclose your worksheet data into a specific area for printing. By **defining** the Print Area, you can ensure that only the cells you want to print are included in the output, saving you time and resources.

HOW TO SET THE PRINT AREA

To set the Print Area, select the cells you want to include in the printout, then go to the **Page Layout** tab and click the **Print Area** button.



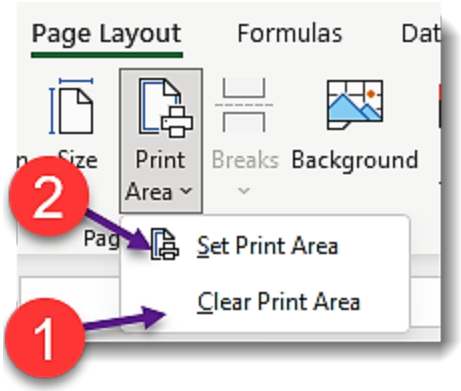
Next, select "**Set Print Area,**".

Only the cells in the defined **Print Area** will be printed.

If the need arises for you to include additional cells in the printout later, go back to the worksheet and select the portion you want to print.

This time, including the new cells in your selection, you return to the **Page Layout** tab and click the "**Clear Print Area**" button followed by "**Set**

Print Area" again.

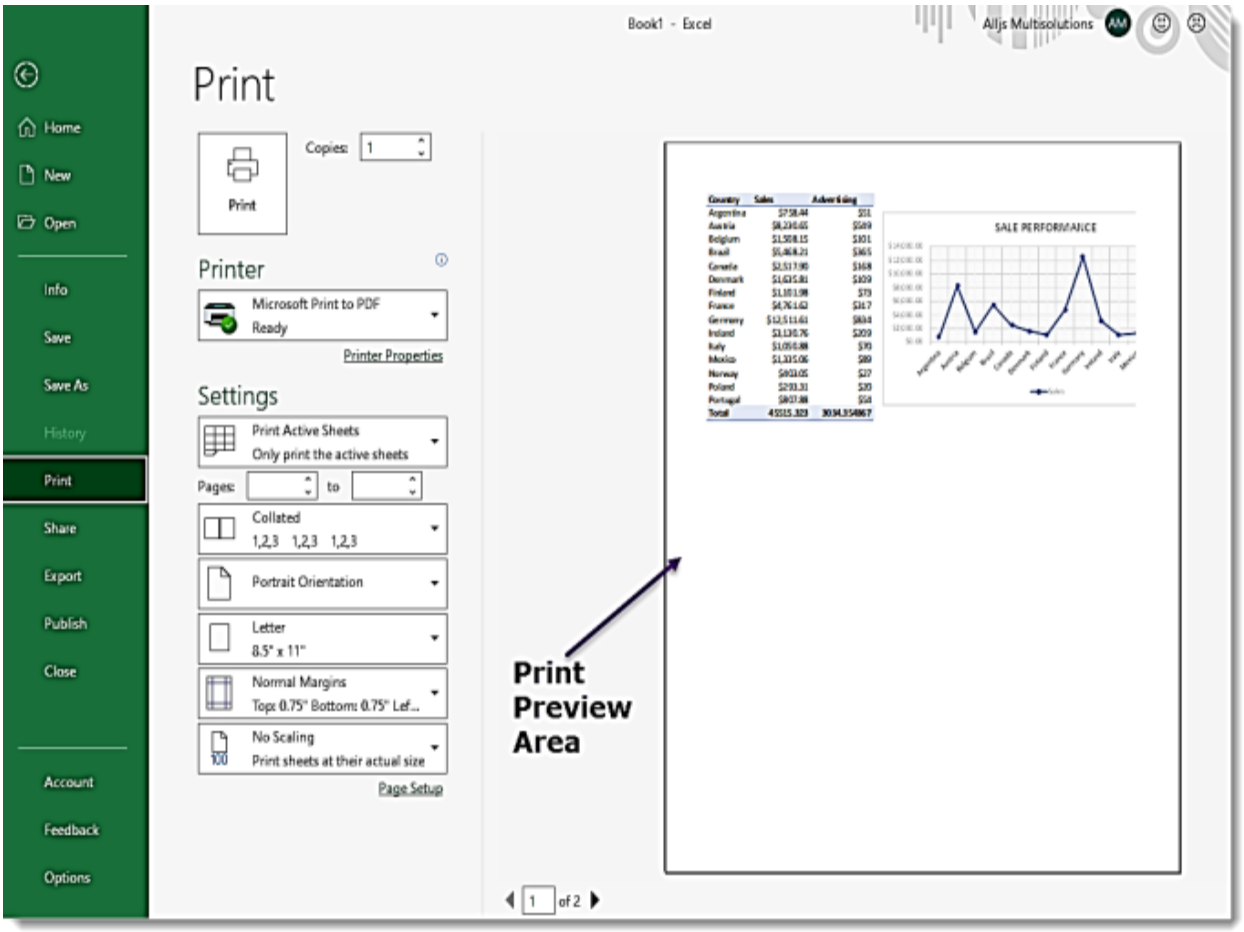


Using the **Print Area** feature in Excel saves paper, ink, and time while still achieving the desired printout.

PRINT PREVIEW

The Print Preview feature lets you view your data's appearance when you print. This differs from previous Excel versions, where the preview function was not as advanced.

To access the Print Preview feature, click the "**File**" menu and select "**Print.**" On the right side of your screen is the Print Preview area.



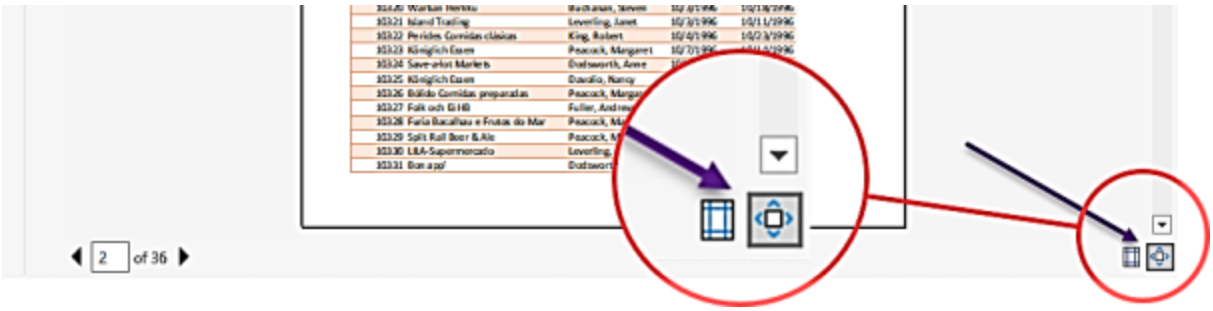
Alternatively, use the shortcut key **Ctrl + F2.**

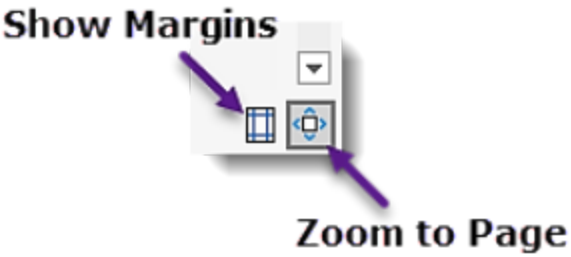
The Print Preview feature is essential to review your worksheet's formatting and layout before printing. This can help you identify any issues

and make any necessary adjustments, potentially saving you time and money by avoiding reprinting due to mistakes or errors.

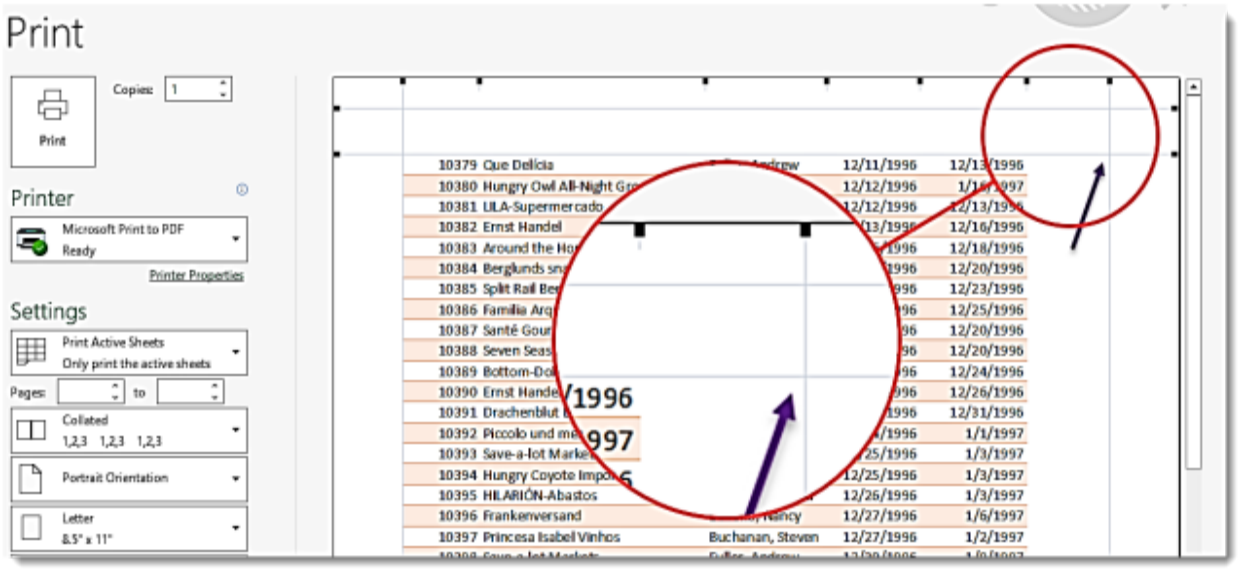
SHOW MARGIN AND ZOOM TO PAGE

You have the **Show Margin** and the **Zoom to Page** icons at the bottom left corner, below the Print Preview Area.





The **Show Margins** button in Excel's Print Preview feature allows you to customize the margins of your document before you print it.



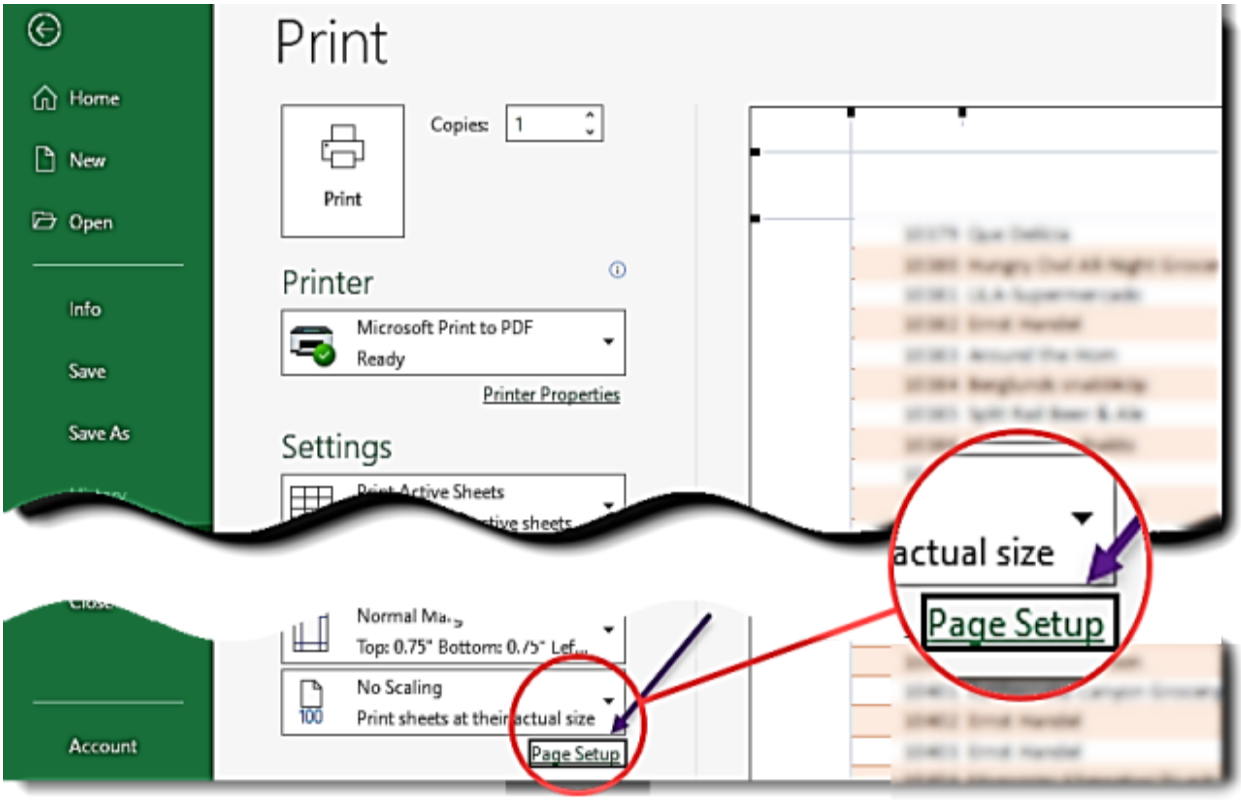
This is useful if you need to fit more text on a page, create a balanced layout, or add a border to your document.

The **Zoom to Page button** in Excel's Print Preview is a valuable feature you can use to ensure your spreadsheets fittingly appear when printed on paper. It automatically adjusts the zoom level so that the entire worksheet fits on a single page, which is especially useful for large, complex documents. This can save time and resources, allowing you to identify and address any formatting or layout issues before printing.

PAGE SETUP

Excel's Page Setup feature offers you a variety of customization options to design your worksheet's print settings. You can adjust the page layout, margins, headers, footers, and page orientation according to your preferences. This allows you to set up a worksheet that is aesthetically pleasing and optimized for printing.

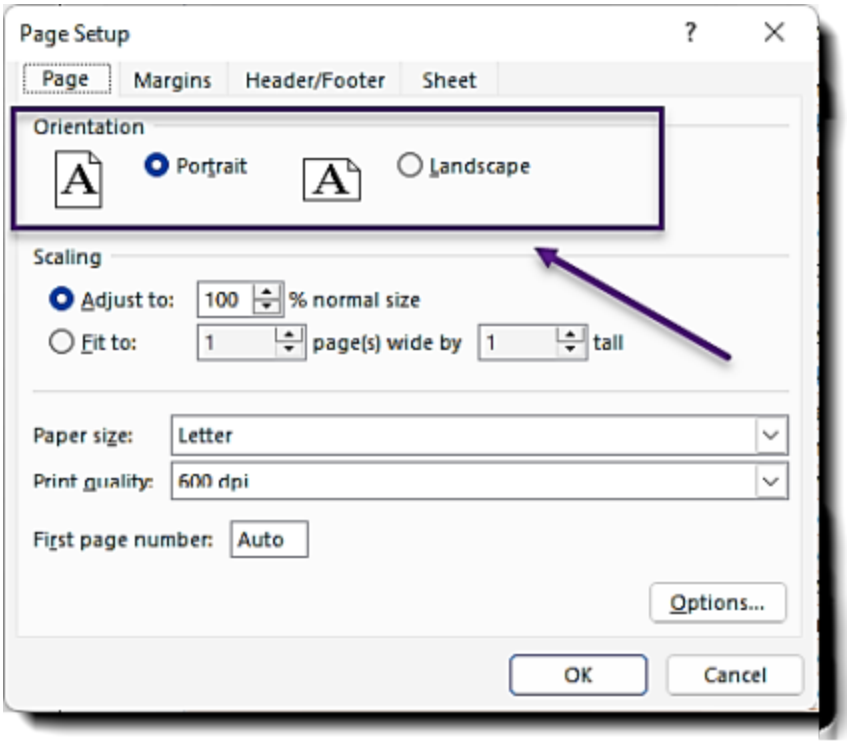
To access the **Page Setup** dialog box in Excel, click the **File** tab on the ribbon, then select **Print**. Next, below the **Settings** tabs, click on **Page Setup.**



THE PAGE TAB

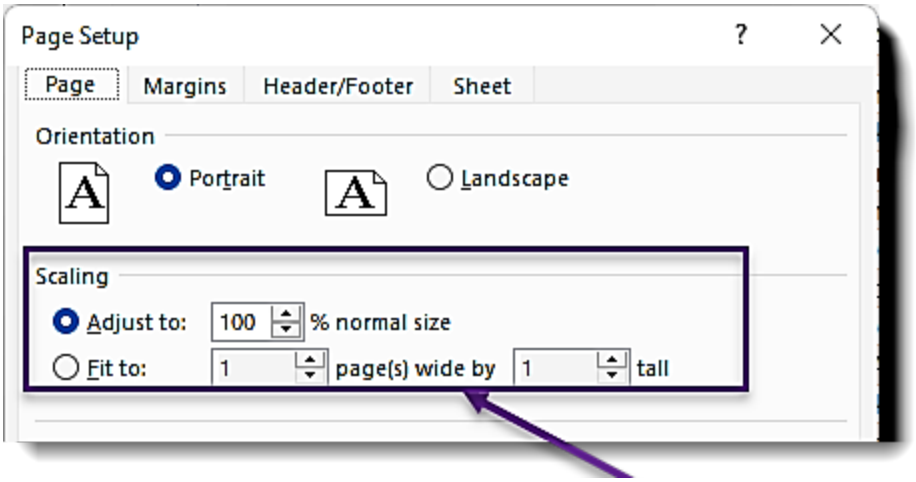
PAGE ORIENTATION

The page orientation determines if your worksheet will be printed in Portrait or Landscape format. It is one of the features available on Excel's Page Setup dialog box.



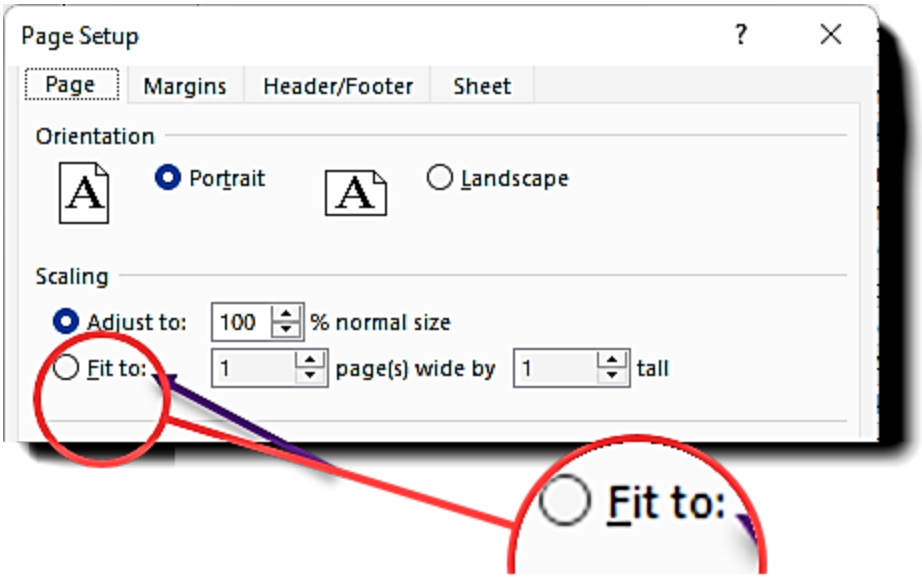
- **Portrait**: Excel's default configuration prints the worksheet vertically on your paper.
- **Landscape**: The worksheet is printed on your paper horizontally.

SCALING



Printing large spreadsheets can present challenges when it comes to layout and formatting. However, the good news is that scaling provides a versatile solution that allows you to adjust the size and shape of your worksheet to fit your page perfectly. With scaling, you can ensure that your data is presented clearly and accessible without compromising its quality or integrity. By utilizing this feature, you can simplify the printing process and quickly achieve professional-looking results.

Scaling is like a tailor's tool that helps you resize your worksheet to fit the page just right.



Just like how a tailor adjusts clothing to fit the wearer's body, scaling allows you to find the best configuration of your data to fit into your page automatically. Scaling gives you the flexibility to adjust the size of your content, whether you need to shrink it down to fit everything on one page or stretch it out to make it easier to read. It's a handy tool that can save you time and effort when formatting your data for printing or sharing with others.

PAGE SIZE

Page size allows you to select the size of the paper you want to print your worksheet.



Excel has a variety of standard paper sizes to choose from, including:

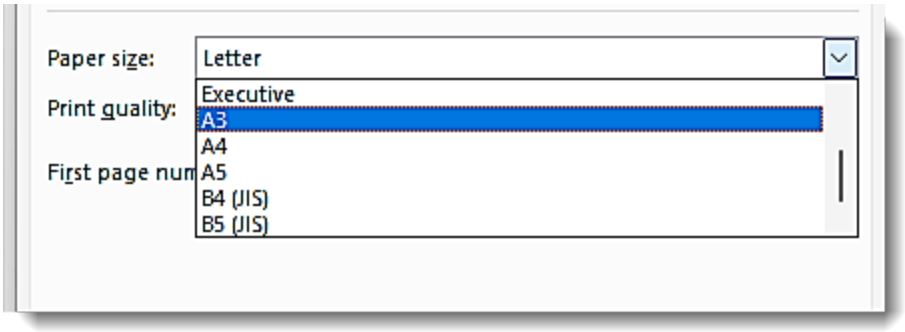
Letter (8.5 x 11 inches)

Legal (8.5 x 14 inches)

A4 (8.27 x 11.69 inches)

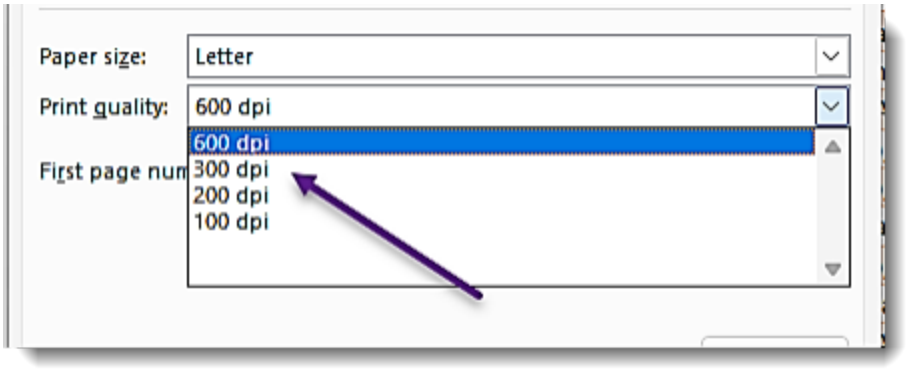
A3 (11.69 x 16.54 inches)

You can also select a custom page size.



PRINT QUALITY

Excel provides a range of print quality options depending on your printer make. These options range from ***Draft copy*** to ***High quality*** or different **Dot-Per-Inch** (DPI), and they determine the resolution of your printed worksheet.

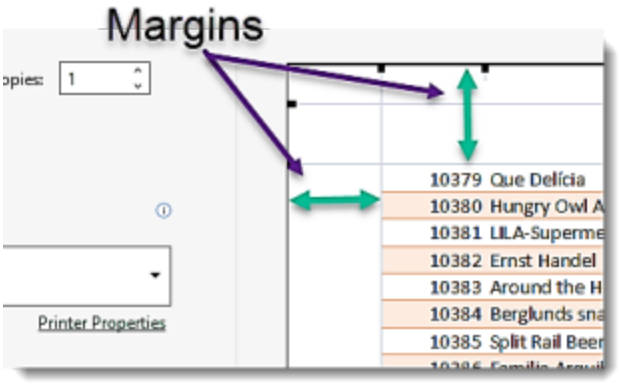


A high dots-per-inch (dpi) resolution is the best option if you want high-quality printing results. However, remember that this can sometimes result in more extended printing time. So, while you will be getting sharper and more detailed prints, you may need to exercise patience while you wait for your documents to finish printing. I suggest you weigh the pros and cons and decide what works best for your needs.

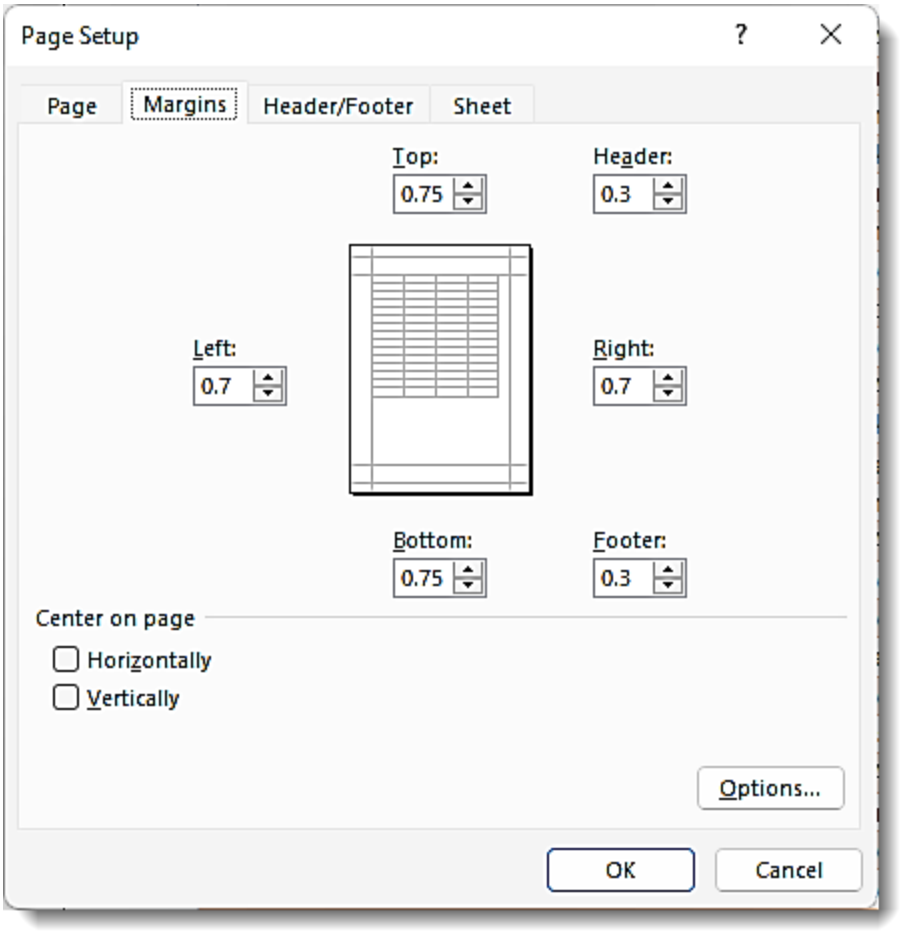
THE MARGINS TAB

PAGE EDGES SPACING

Margins are the space between the edge of a page and the content within it. These margins help define the page edges and the worksheet's content in Excel.



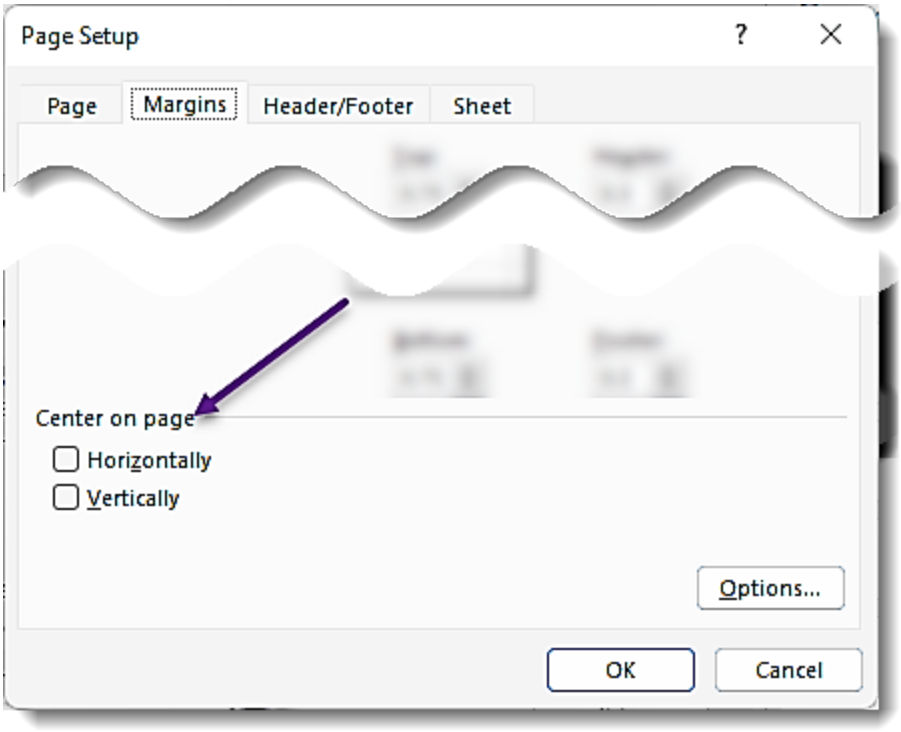
By default, Excel comes with preset margin settings, but if those don't meet your requirements, you can customize them to your needs.



Just play around with the settings until you find the perfect fit!

CENTER TO PAGE

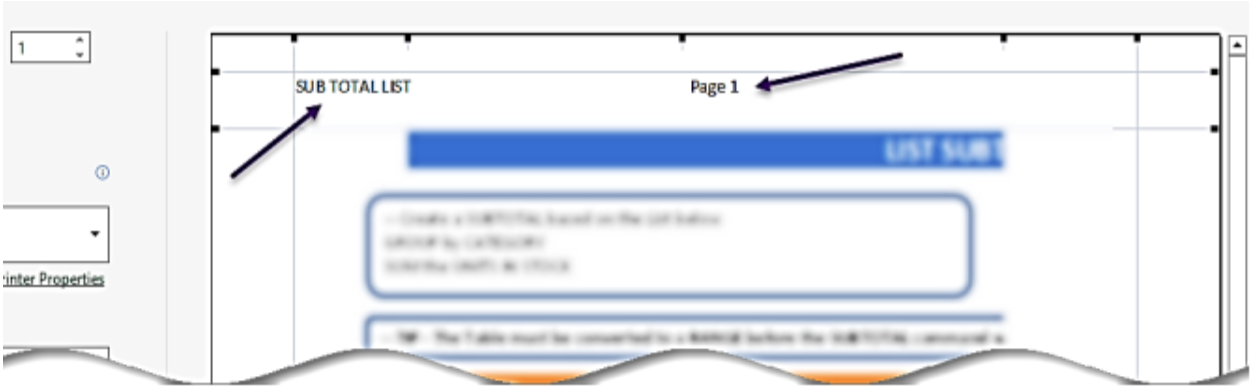
Centering on page in the Excel Page Setup dialog box is used to align the data in the middle of the page both vertically and horizontally so that there is an equal amount of space on the top, bottom, left, and right sides.



Select the "**Vertically**" and/ or "**Horizontally**" checkboxes in the Page Setup dialog box to do this. Once you check these boxes and apply the changes, your data will be centered on the page within the margins.

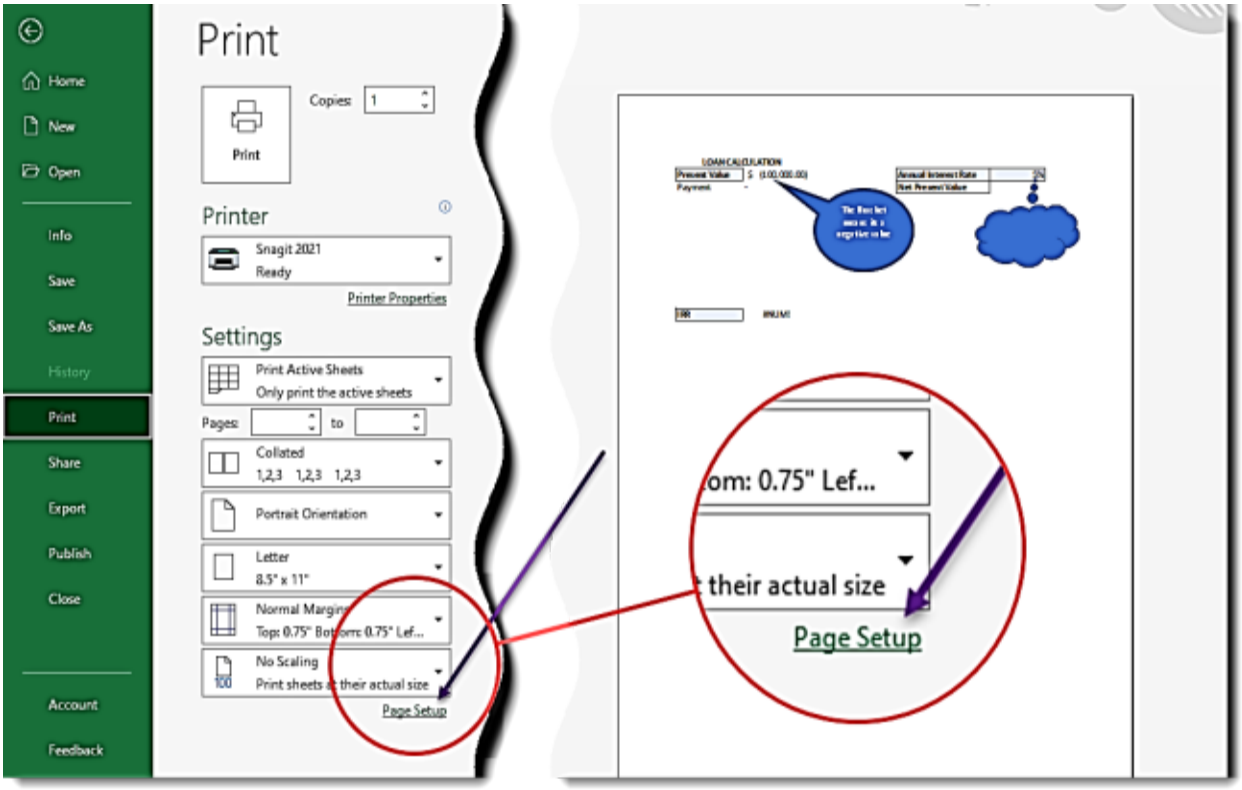
HEADERS AND FOOTER TAB

Headers and footers in Excel are essential features that allow you to add text, images, and other elements to the top and bottom of every page you print.

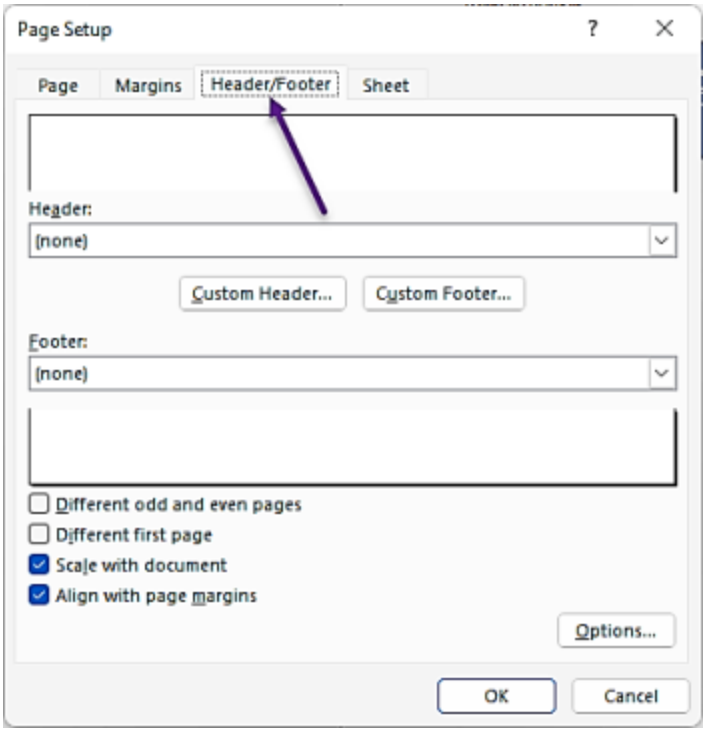


You can also customize these elements to provide additional information, such as page numbers, titles, and company logos.

After setting your **Print Area**, the header or footer can be created by accessing the **Page Setup dialog** box from the **Print Preview** interface. Then you click the **Page Setup** link in the lower left corner.



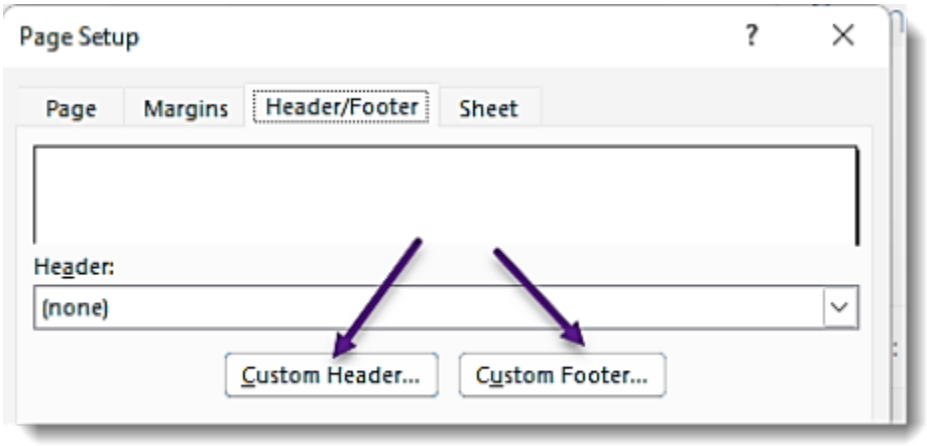
Next, you can choose the Header/Footer tab to access the options available for customizing your headers and footers.



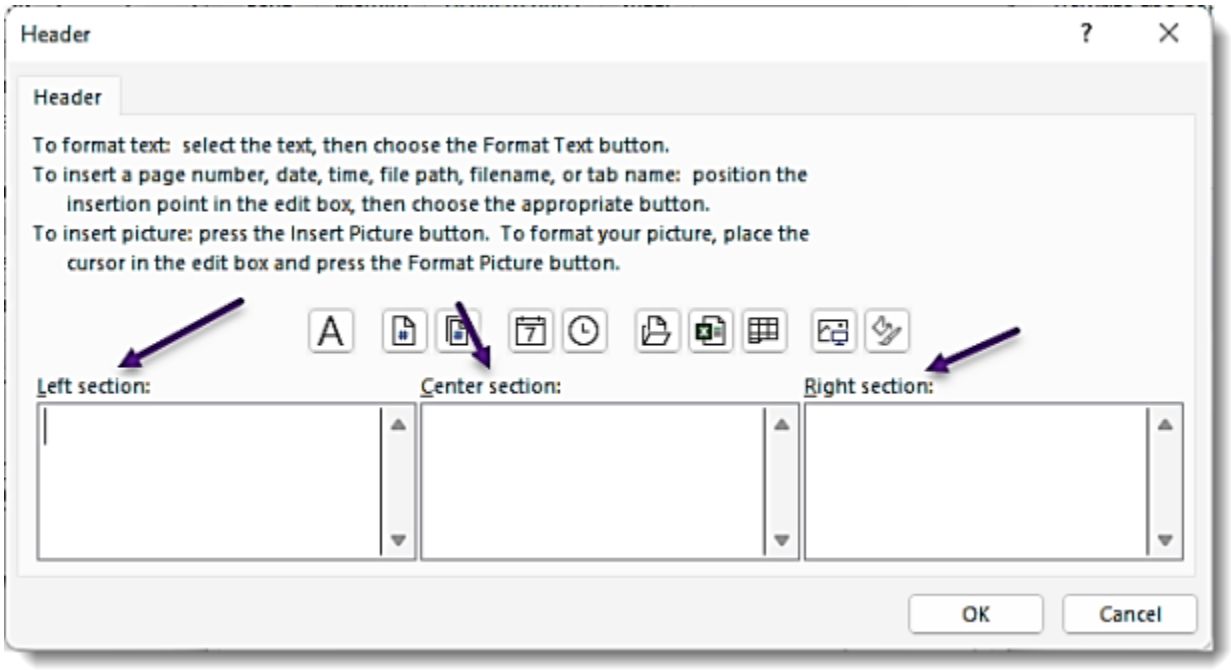
Some of the options available for customizing the headers and footers in Excel include:

- Adding pre-built elements such as page numbers, the date and time, and file path information
- Adding custom text or graphics to the header or footer
- Choosing different alignment options, such as left, center, or right alignment
- Adjusting the margins and spacing of the header or footer
- Formatting the text or graphics in the header or footer, including font size, color, and style

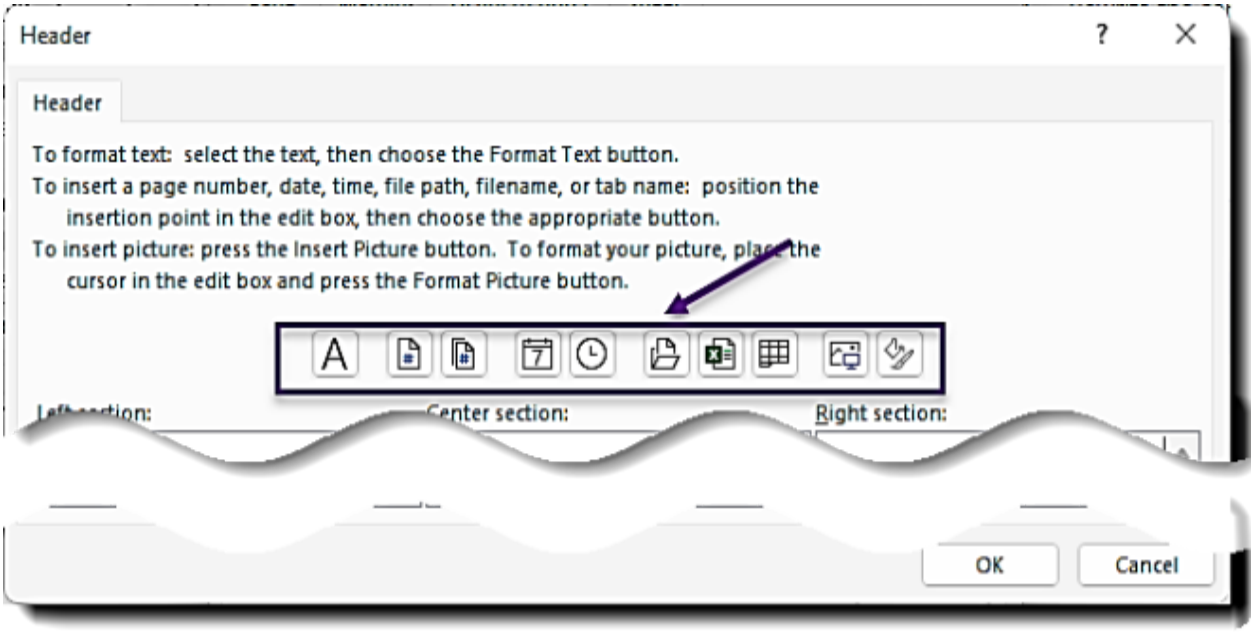
Select either the custom Header or Footer one at a time to add any of these features.



For instance, in the Header dialog box, you can place what you want to appear in either the Left section Center Section or Right section.



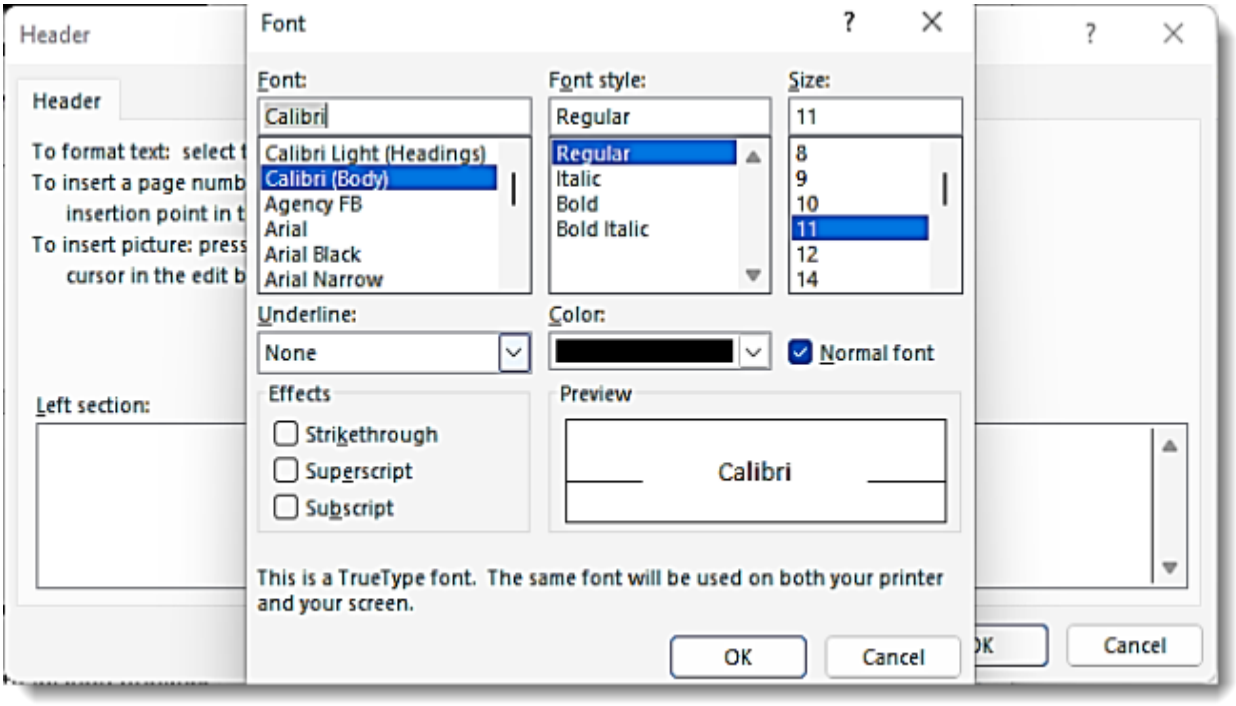
Click any of these buttons to get a preview of what they do.



For instance, the First button with an **A** is used to open the **Font** dialog box.

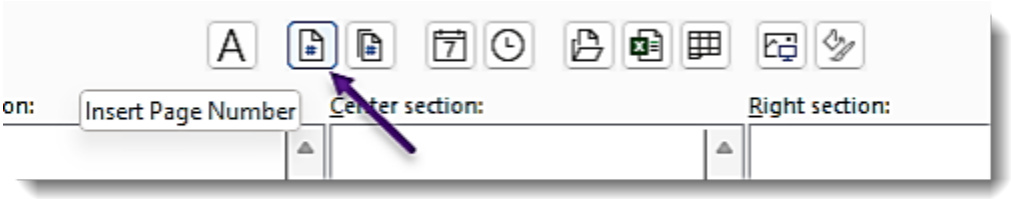


The Font dialog box lets you choose the font, font size, font color, underline, and effects on the text you insert in your header or footer.



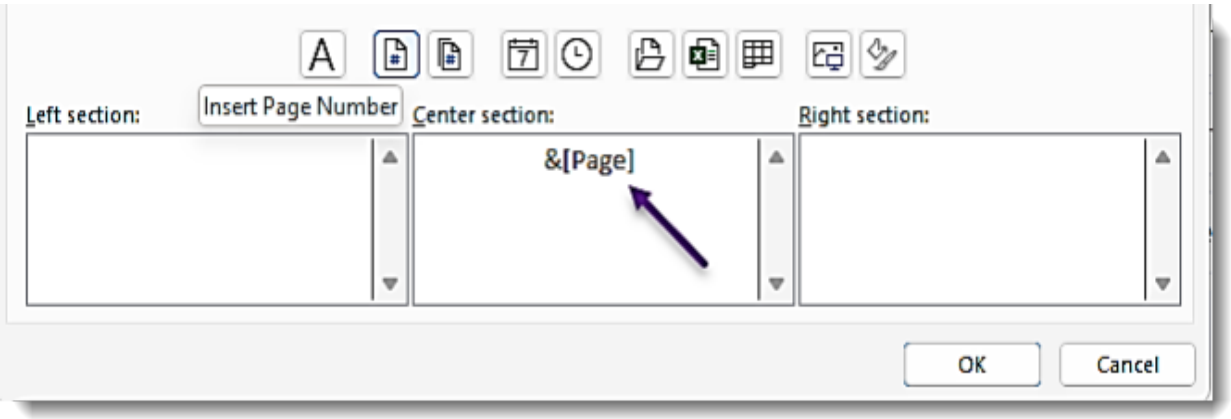
Once you are done with your selections, click the **OK** button to effect the changes in your header or footer text.

The next button is used to **Insert Page Number** in your header or footer.

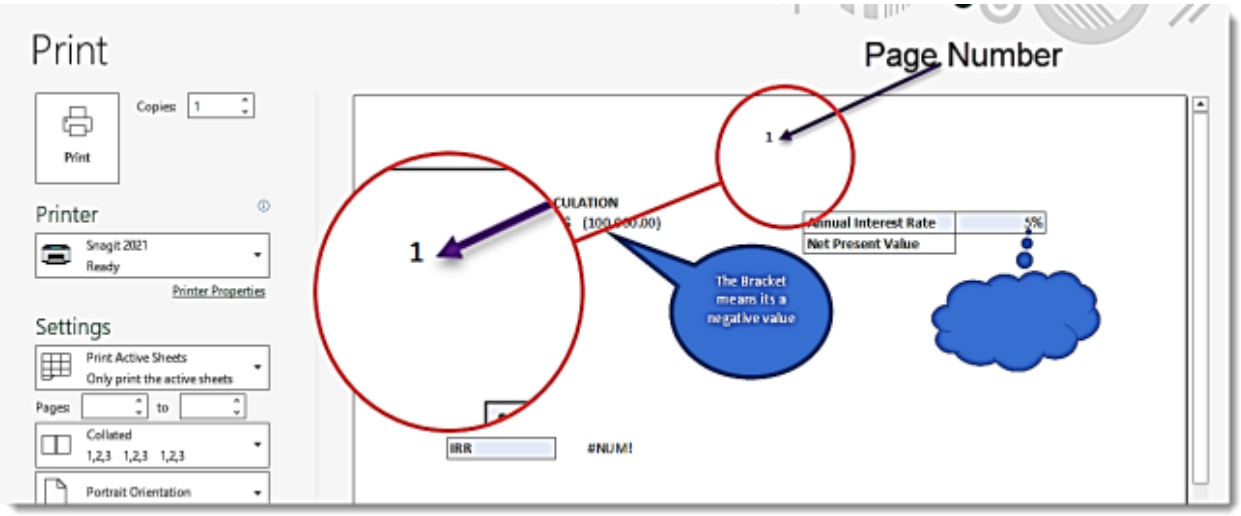


You only need a click on this button to insert a prompt in the position where you want the Page number to appear.

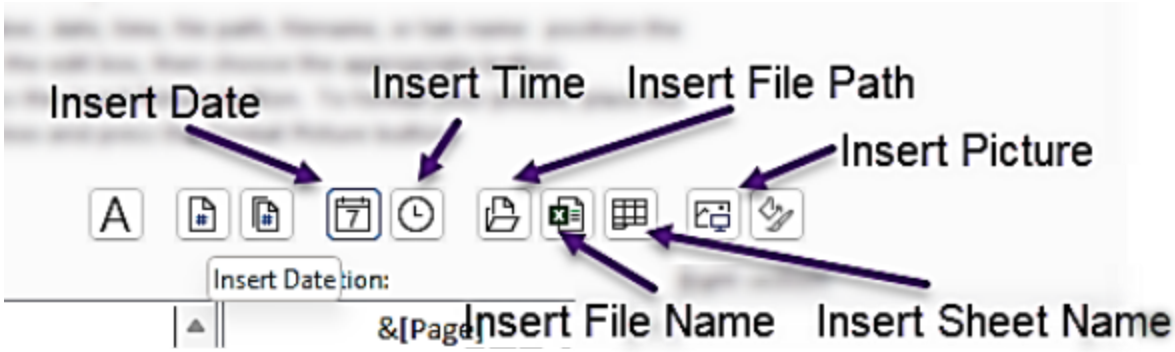
For example, the prompt will appear when I place my cursor in the Center section and click the **Insert Page Number** button.



If I go ahead and click the **OK** button, the Print Preview area will give me an idea of what it will look like when I print.



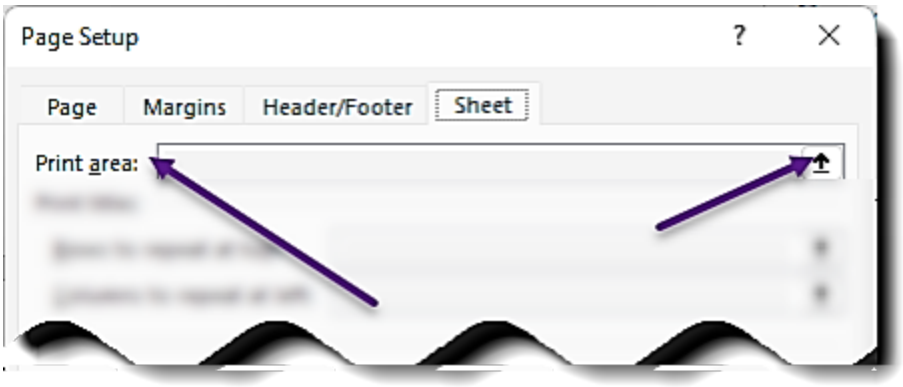
Other buttons includes:


Insert Date
Insert Time
Insert File Path
Insert Picture
Insert Date
&[Page]
Insert File Name
Insert Sheet Name

SHEET OPTIONS TAB

PRINT AREA BOX

When you want to print a specific worksheet range quickly, click on the "**Print area**" box and select the cell range you want to print.

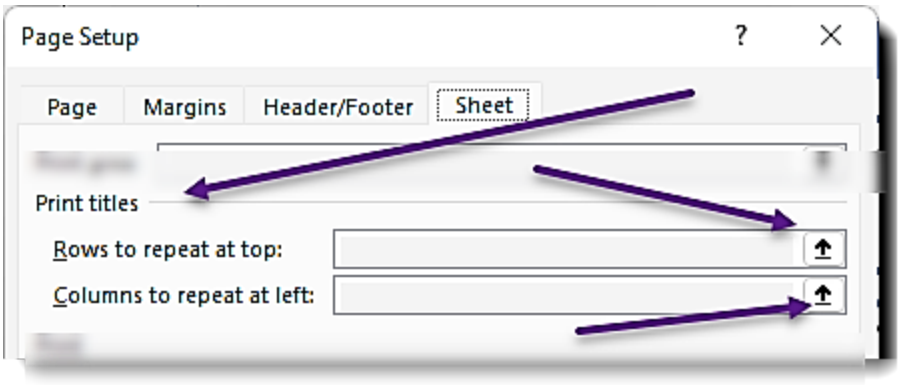


You can also select additional areas on the worksheet that you want to include in the printout by dragging your mouse over them.

PRINT TITLES

When printing a large Excel worksheet that spans multiple pages, it can be difficult to distinguish between columns and rows. Excel has a feature that allows you to print specific rows or columns as page headers. This facilitates reading and interpretation of your printed worksheet.

To begin, navigate to the **Print Titles** section under the **Page Setup** dialog box and select any options.



Depending on whether you want a horizontal or vertical title, you can select Rows to repeat at top or Columns to repeat at the left in the resulting dialog box.

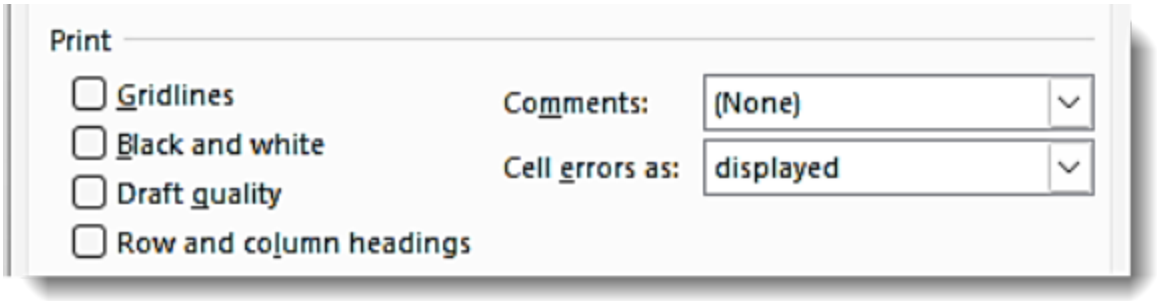
Afterward, choose the cell or cells you wish to utilize as the title. You can accomplish this by clicking the "**Collapse Dialog**" button on the dialog box's right side. This button will move the dialog box aside momentarily, allowing you to select directly the cells you want to utilize as the title on the worksheet.

After choosing the title cells, you can expand the dialog box by clicking the **Collapse dialog** button again. This will enable you to modify additional

print settings if required. When you're ready to print, Excel will automatically repeat the chosen rows or columns as titles on all printed pages of the worksheet.

PRINT

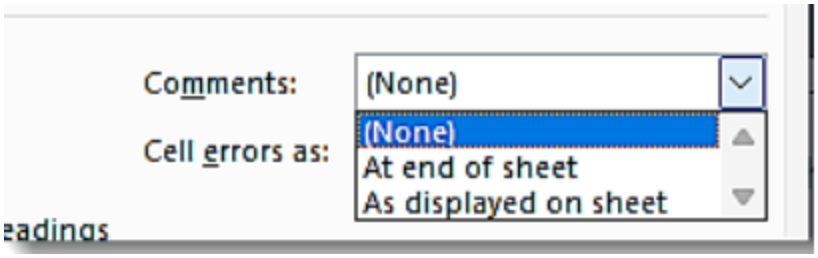
This section determines the content printed from the worksheet, the printout's color scheme, and the level of print quality.



- **Gridlines**- By default, when you print a worksheet in Excel, the gridlines on the screen do not appear in your printout. However, you must check the Gridlines box if you want to include the gridlines in your printed document.
- **Black and White** - If you have a color printer but only want to print in black and white, you can select the "**Black and white**" checkbox. This option is not selected automatically, so you must check the box yourself. But if you have a printer that only prints in black and white, you don't need to worry about this option.

Draft quality - If you want to print something quickly and don't mind if the quality is not the best, you can select the "**Draft quality**" option. This feature is only available on printers that support the draft-quality mode. Remember that choosing the " **Draft quality**" option won't make any difference if your printer doesn't have this mode.

- **Row and column headings** - Row and column headings are the labels that appear above each column and to the left of each row in your spreadsheet. These labels facilitate data organization and navigation within the spreadsheet. You can also repeat the headings on each page if your spreadsheet spans multiple pages.
- **Comments** - Choose the placement of the annotations you added to worksheet cells in the printout by selecting a location within the box. To print annotations in their original position on the worksheet, select "**As displayed on sheet”**.

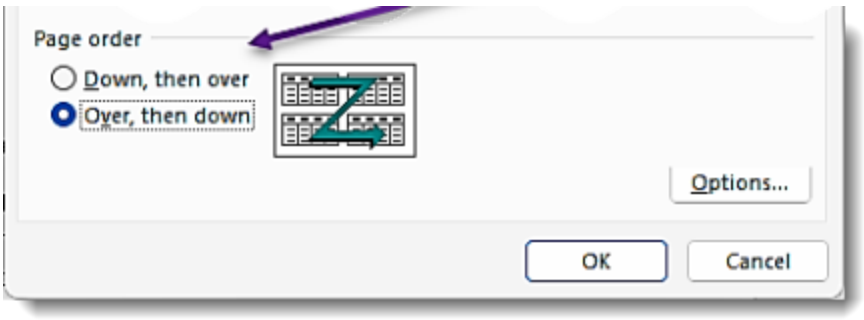


If you intend to print all annotations together on a separate page after the printout, select "**At end of sheet**." By default, annotations are not added in the printout because "**None**" is selected.

- **Cell errors as** - You can choose how to display cell errors that show up on the worksheet in the printout using the options available in this box. The default setting displays errors as they are, but you can't show them as <blank>,—or #N/A.

PAGE ORDER

When data in a worksheet exceeds one page, you can choose between two options to determine the order in which it is numbered and printed: "**Down then over**" or "**Over then down**."



The preview image displays how your document will print based on your selected option.

LESSON 13

DATA VALIDATION

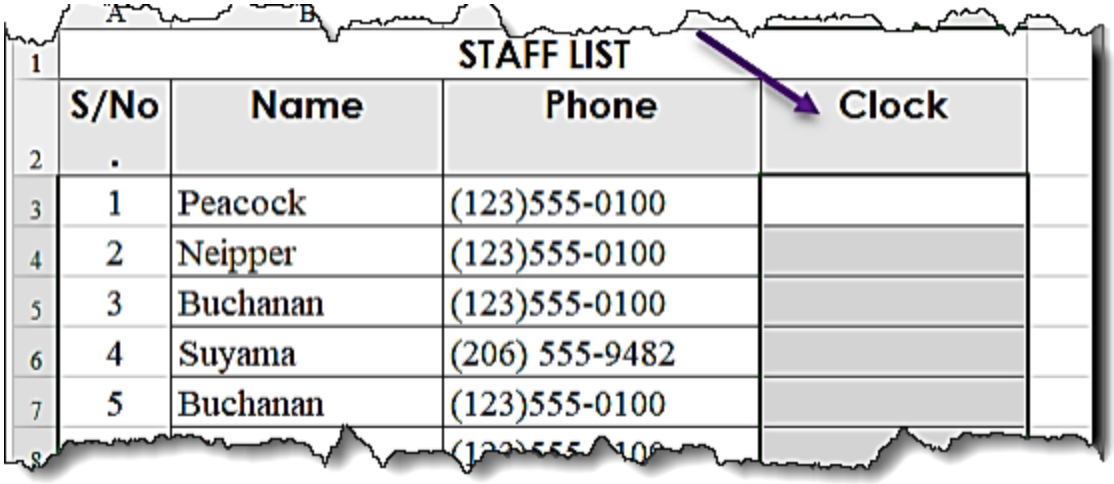
Excel has a feature that allows you to validate the data you enter into the cells in an Excel Worksheet. Data validation enables you to establish rules for data entry in a cell, and then Excel will check the data entered against those rules. You can choose from several options depending on what you want to do with the data. The essence is to ensure the data entered is accurate and conforms to specific rules.

For example, you can prevent someone else from entering invalid data into a worksheet you are working on. In another way, you can allow other users who have access to your worksheet only to be able to enter numbers in a specific range. This can be done by setting up rules restricting the cell only to accept numbers within that range. Excel won't allow it if someone tries entering a value outside your set range. You can also make Excel show a warning sign if someone else tries to break the rules you have set on your worksheet. This way, other users with access to your worksheet can still enter the data they want, but they'll be warned if it doesn't meet a specified criteria. You can also set up an error message when someone enters invalid data, which is a helpful way to let those with access know what went wrong and what they need to do to fix it.

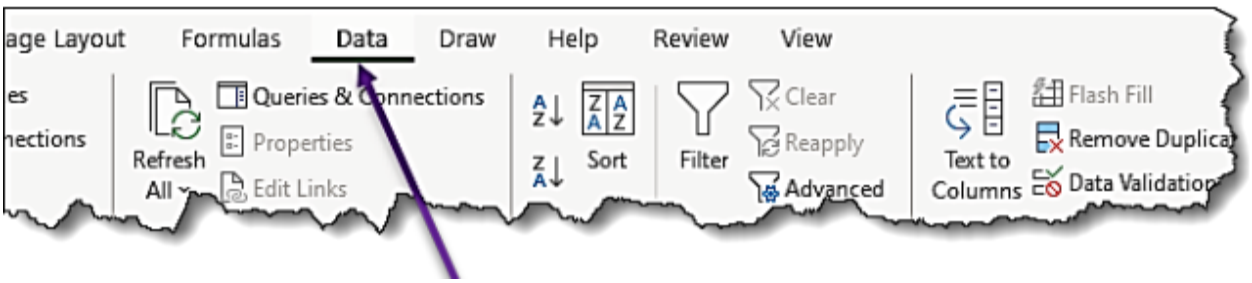
ADDING A DATA VALIDATION

Below are steps you can use for adding Data Validation to a work hour in a factory.

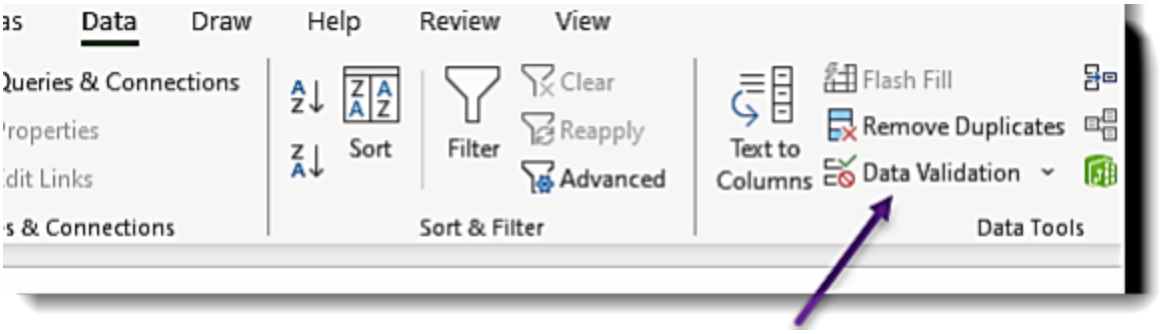
1. Select the cell or range of cells on the worksheet you want to carry out data validation on.



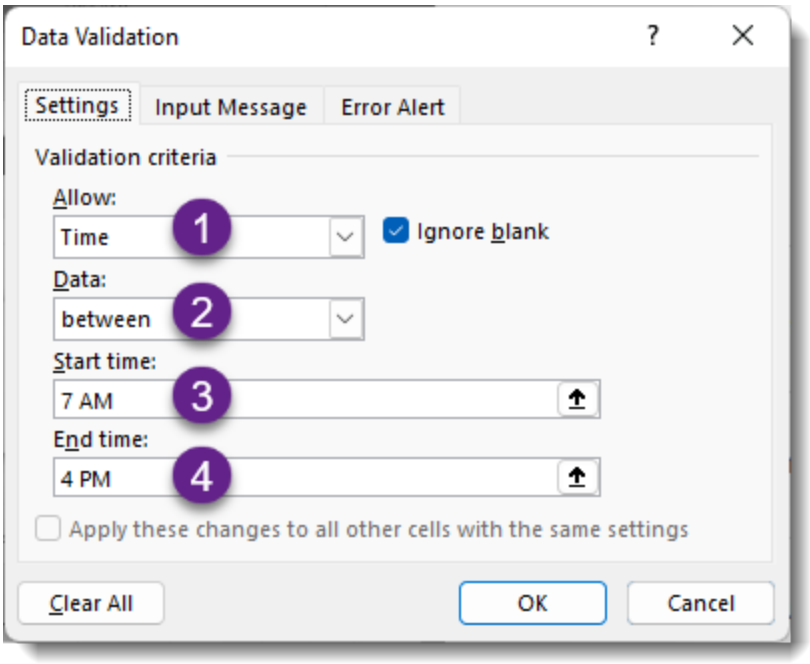
1. Go to the "**Data**" tab in the ribbon at the top of the screen.



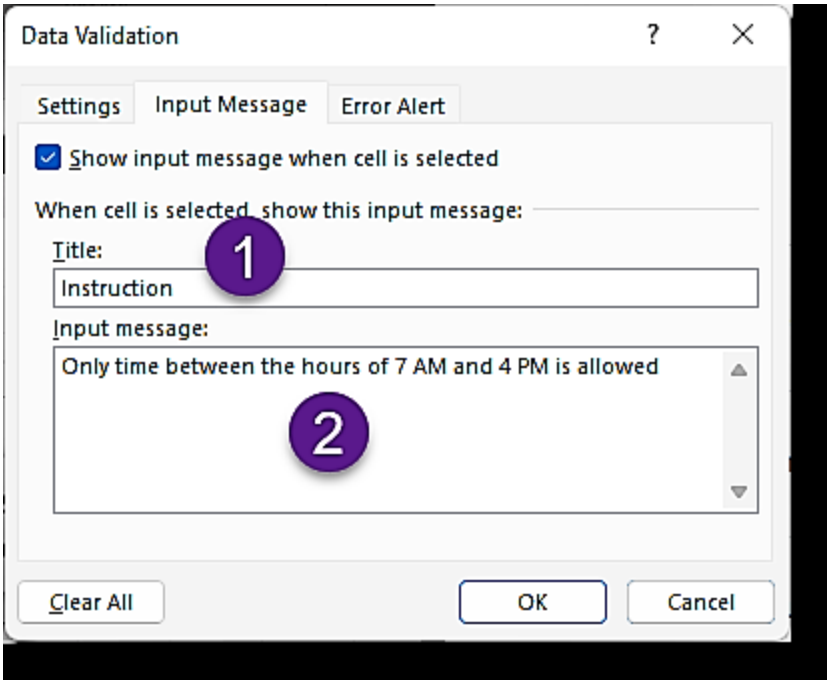
1. Click on "**Data Validation**" button in the "**Data Tools**" group.



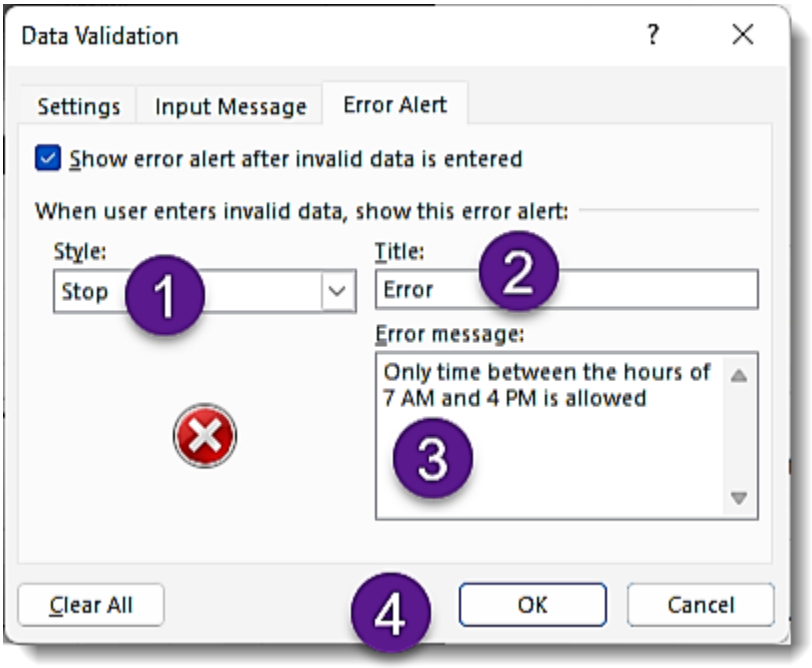
1. Go to the **Allow** drop-down list and select they type of Data you want to allow. I my own case, I am restricting the data to time. The value to be entered must be between 7am and 4pm.



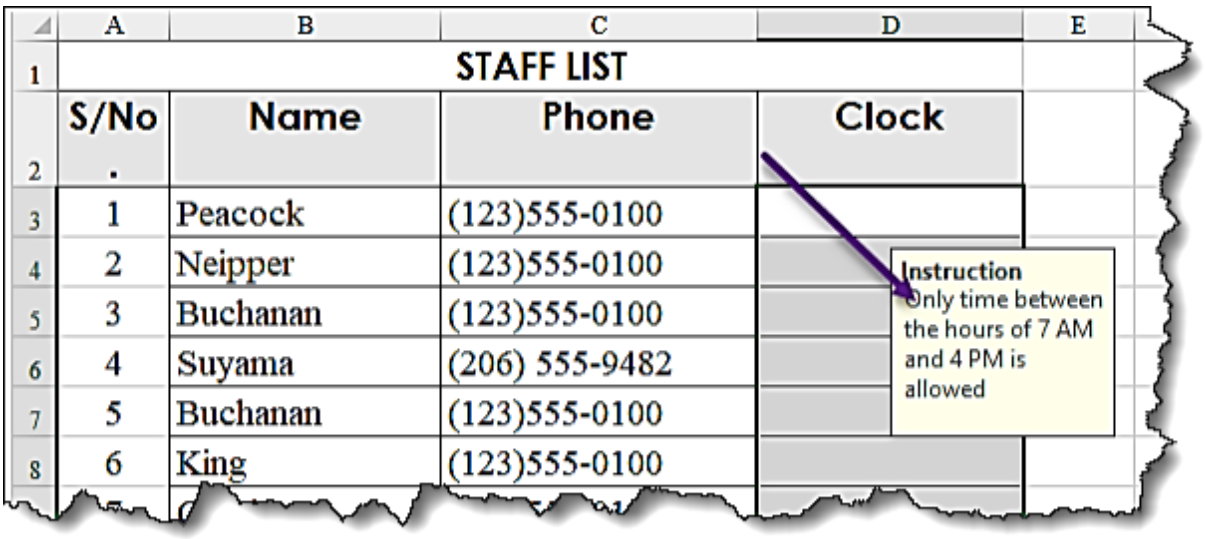
1. Next, click on the **Input Message** tab and enter the message you want to appear when the cell affected by the data validation is selected.



1. Click on the **Error Alert** tab and enter the message you want to appear when data in entered incorrectly.

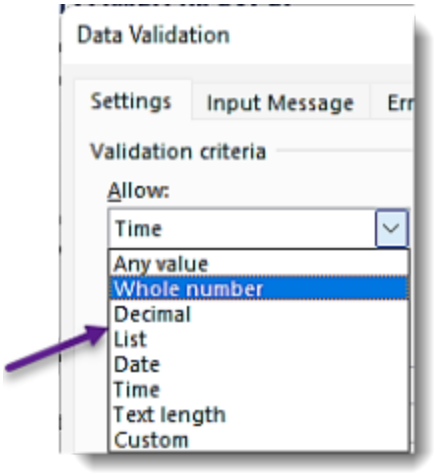


Click on the **OK** button to complete the process.



DATA VALIDATION CRITERIA ALLOWED IN EXCEL

Using data validation in Excel, you can restrict the information that can be entered into cells by anyone with access to the worksheet. Examples of validating criteria include the following:



WHOLE NUMBER AND DECIMAL CRITERIA

- **Whole number:** This criterion only allows whole numbers to be entered.
- **Decimal**: Permits decimal numbers only.

DATE AND TIME CRITERIA

- **Date**: Allows only values that are in date format.
- **Time**: Allows only values that are in time format.
- **Date and Time**: Allows only values that are in date and time format.

TEXT LENGTH CRITERIA

Text length: Permits only text within a specified character length range.

CUSTOM FORMULA CRITERIA

Custom formula: You can create a formula specifying the allowed input.

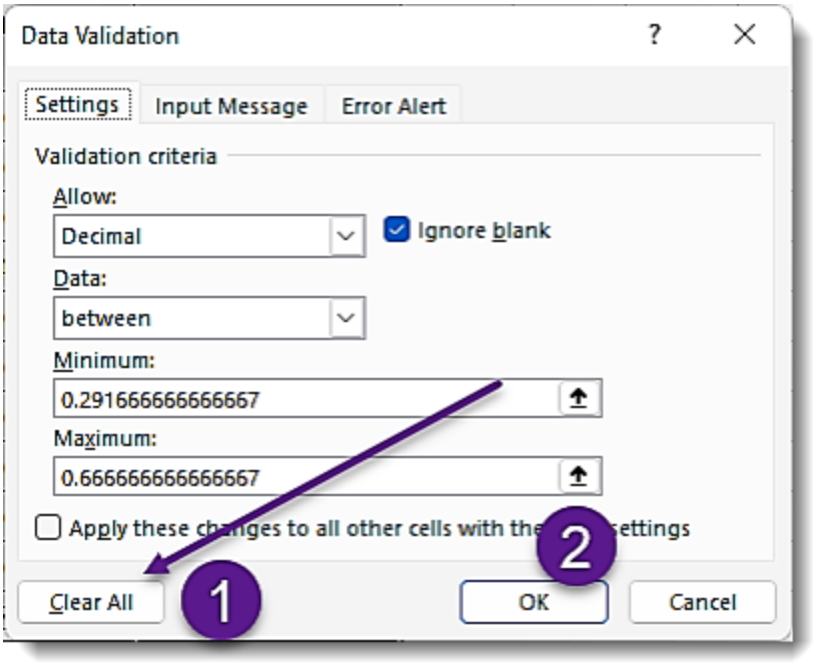
LIST CRITERIA

List: Allows only values selected that are in a pre-defined list of values.

Using data validation criteria allows you to ensure the accuracy and consistency of the data in your Excel worksheets.

REMOVING DATA VALIDATION

1. Select the affected cell or range of cells within the worksheet to remove data validation.
2. Click on the "**Data**" tab in the ribbon.
3. Click the "**Data Validation**" button to display the "**Data Validation**" dialog box.
4. Click on the "**Clear All**" button.



Click "**OK**" to confirm.

LESSON 14

EXCEL PIVOT TABLES

UNDERSTANDING EXCEL PIVOT TABLES

As I went deeper into using Excel for my daily task, I faced many challenges dealing with a large amount of data. Searching for trends or simply trying to get a quick overview of my worksheet was difficult. Fortunately, Excel offers a range of tools to help me organize and analyze my data. Excel became my toolbox containing everything I needed to sort, filter, and visualize my data. This way, I could identify patterns and gain insights from my data.

Using Excel, data can be summarized in a clear and understandable format, enabling well-informed decisions making process, and that is what you will learn in this lesson.

I will start by getting you acquainted with Excel's Pivot table.

Pivot tables are versatile and have many applications, from fundamental data analysis to intricate financial modeling. They are superb feature that allows you to analyze and summarize extensive datasets quickly and efficiently. By utilizing pivot tables, you can promptly identify trends, detect outliers, and recognize patterns in your data. In essence, pivot tables enable you to break down voluminous datasets into smaller, more manageable parts and subsequently organize and summarize the information to align with your objectives.

Imagine you are analyzing sales data for a retail company. You might have a spreadsheet that lists each sale with the customer's name, the product sold, the price, and the date of the sale. With a pivot table, you can quickly group the data by product, customer, or date, allowing you to see trends and

insights that might otherwise be hidden. Using pivot tables can save you significant time and effort compared to manually sifting through data.

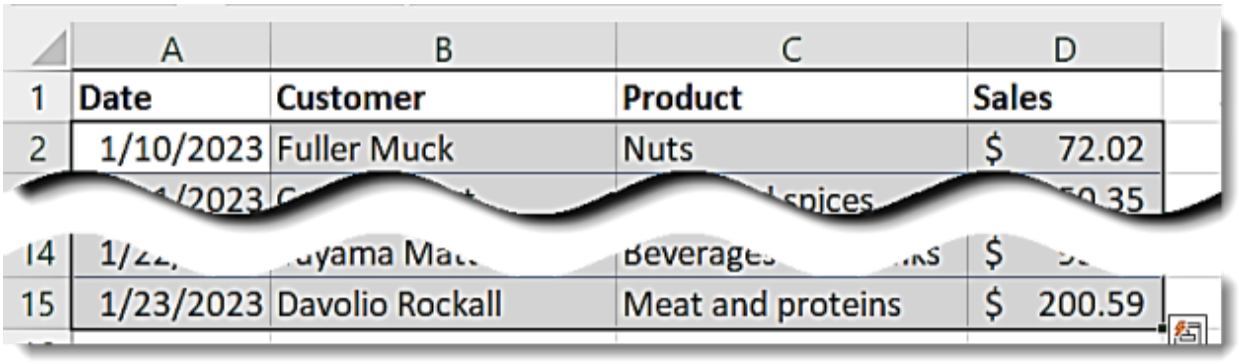
CREATING AN EXCEL PIVOTABLE

Follow the steps below to create PivotTable in Excel.

1. Begin by organizing your data into a table format with clear column headings, as this will assist Excel in comprehending the arrangement of your data.

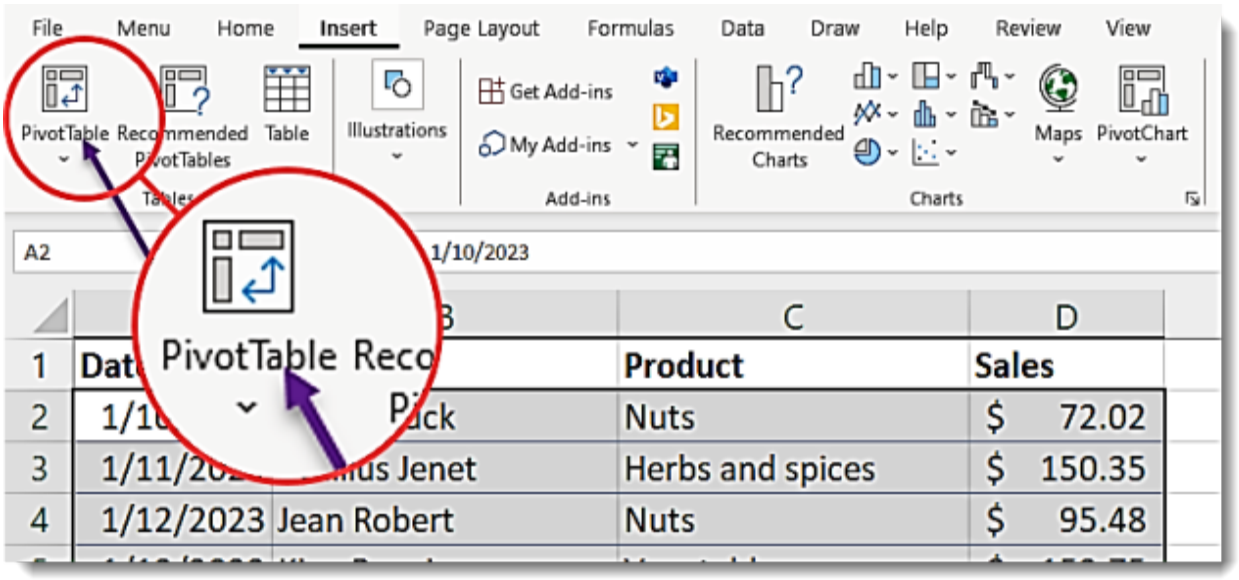
	A	B	C	D
1	**Date**	**Customer**	**Product**	**Sales**
2	1/10/2023	Fuller Muck	Nuts	$ 72.02
3	1/11/2023	Cecilius Jenet	Herbs and spices	$ 150.35
4	1/12/2023	Jean Robert	Nuts	$ 95.48
5	1/13/2023	King Beggi	Vegetables	$ 152.75
6	1/14/2023	Zare Rockall	Cereal	$ 132.72
7	1/15/2023	Kotas Strathe	Pasta	$ 146.78
8	1/16/2023	Leverling Bemwell	Preserves	$ 143.57
9	1/17/2023	Neipper Giampietro	Herbs and spices	$ 6.93
10	1/18/2023	Sergienko Muck	Cakes	$ 50.88
11	1/19/2023	Giussani Strathe	Fish	$ 10.31
12	1/20/2023	Dodsworth Beggi	Ice cream	$ 128.62
13	1/21/2023	Callahan Matthessen	Bread	$ 98.60
14	1/22/2023	Suyama Matthessen	Beverages and drinks	$ 95.20
15	1/23/2023	Davolio Rockall	Meat and proteins	$ 200.59

1. Select the range of data that you want to use for your PivotTable. This can be done by clicking and dragging your mouse over the desired range of cells. From the above illustration, cells **A2** to **D15** were selected.

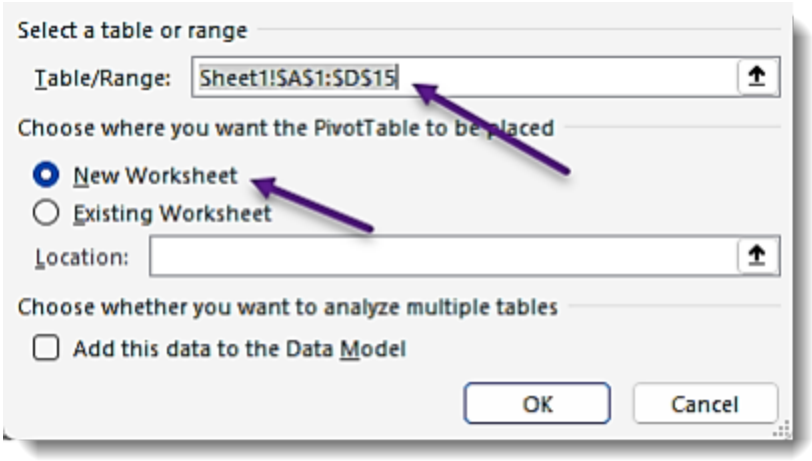


	A	B	C	D
1	Date	Customer	Product	Sales
2	1/10/2023	Fuller Muck	Nuts	$ 72.02
	/2023	C	spices	35
14	1/22,	uyama Mat	Beverages	$
15	1/23/2023	Davolio Rockall	Meat and proteins	$ 200.59

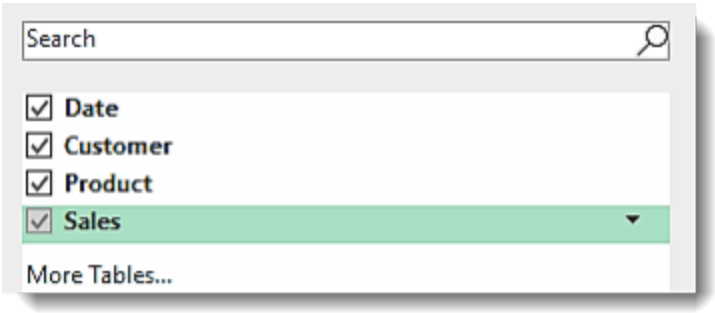
1. Next, click the "**Insert**" tab in the ribbon and select "**PivotTable**". This will pop up the "**Create PivotTable**" dialog box.



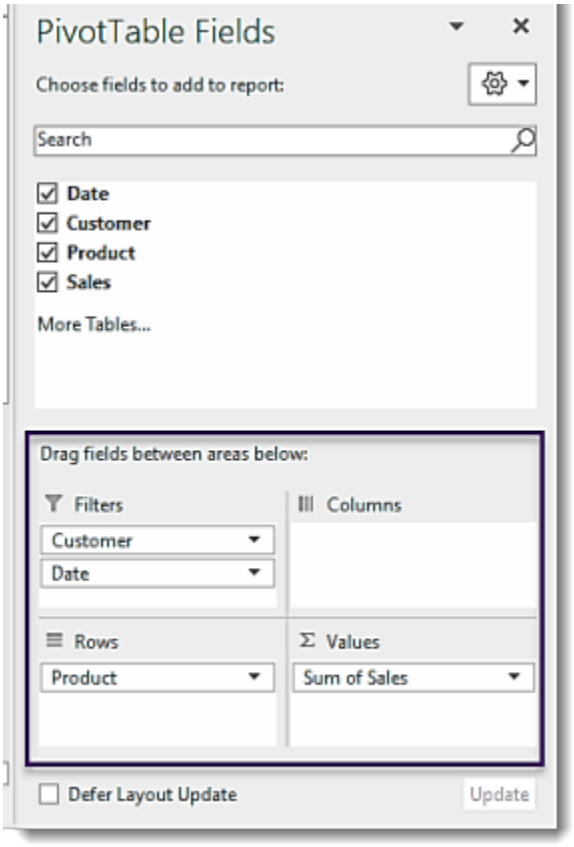
1. In the "**Create PivotTable**" dialog box, select the correct range of data, and **choose** where you want your PivotTable to be placed (e.g., a new worksheet or an existing worksheet).



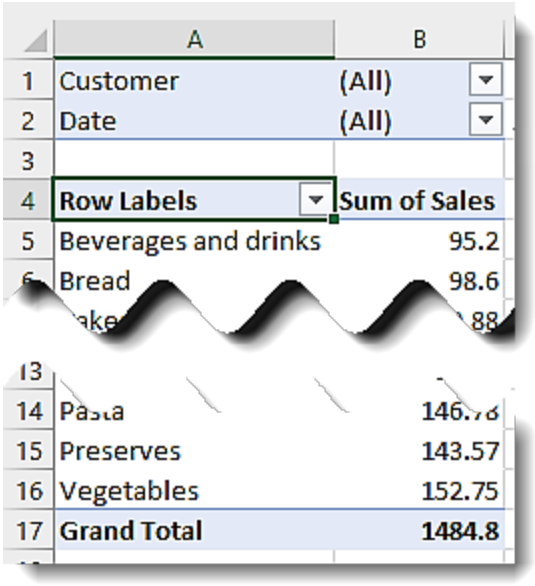
1. Click "**OK**" to create your PivotTable.
2. Select the fields you wish to incorporate in your PivotTable using the PivotTable Fields pane.



1. To create the desired structure, move the fields to the designated areas of "Rows," "Columns," "Values," and "Filters" through drag and drop.



1. To summarize your data, select a field in the "**Values**" area and choose an aggregation function (e.g., sum, count, average). This will calculate the specified function for each combination of the rows and columns in your PivotTable.



	A	B
1	Customer	(All)
2	Date	(All)
3		
4	**Row Labels**	**Sum of Sales**
5	Beverages and drinks	95.2
6	Bread	98.6
13		
14	Pasta	146.78
15	Preserves	143.57
16	Vegetables	152.75
17	**Grand Total**	**1484.8**

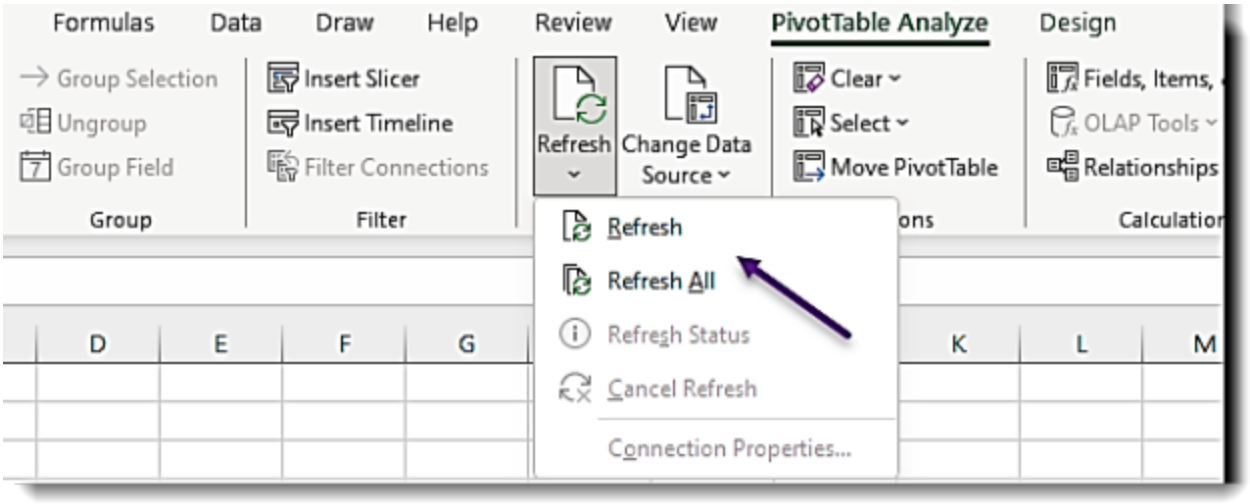
You can also use filters to drill down into specific subsets of your data. For example, you could filter by date range or a particular category.

REFRESHING A PIVOT TABLE

To update a pivot table with the latest data from its source, you need to **refresh** it. It's important to refresh the pivot table whenever there's a change in the source data to ensure that it reflects the new information accurately.

The steps below is used to refresh a pivot table:

1. Click any cell in the pivot table.
2. Click on the **PivotTable Analyse** tab.
3. Click the **Refresh** or **Refresh All**.



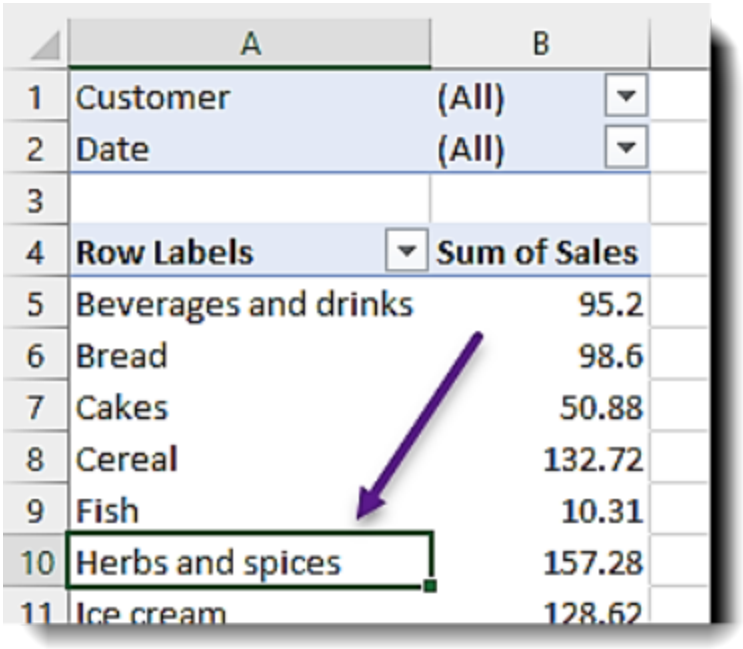
If the source data changes, Excel will update the pivot table with the latest data. Always remember to refresh your pivotable to keep things up-to-date.

SORTING AN EXCEL PIVOT TABLE

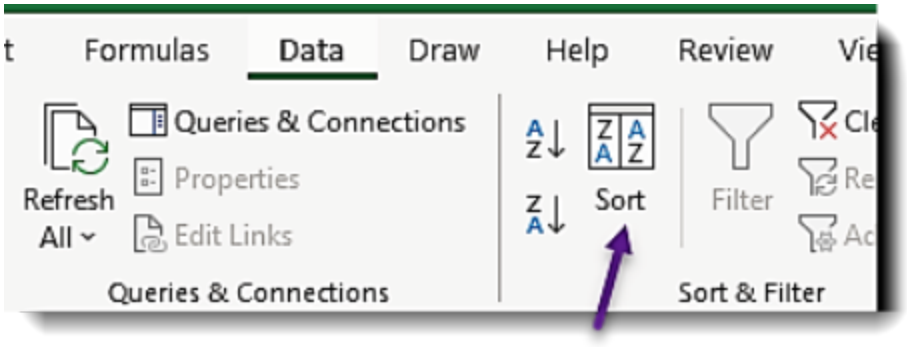
Sorting an Excel Pivot Table is an advantageous feature that allows you to sort and analyze large volumes of data swiftly and effectively. The Pivot Table, as a robust tool, compresses massive data sets into a well-organized, compact format that can be conveniently sorted and filtered.

Follow the steps below to sort an Excel Pivot Table:

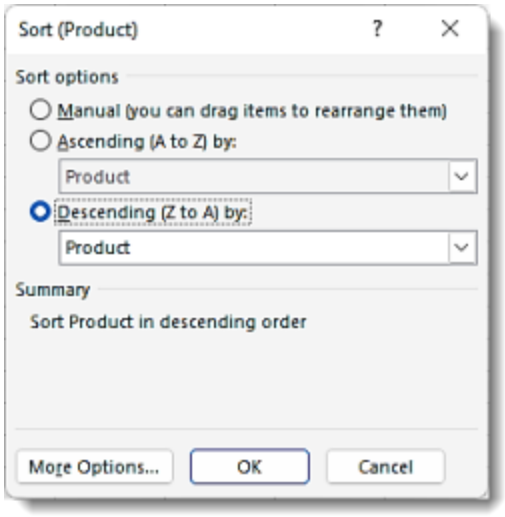
1. Select any cell within the Pivot Table.



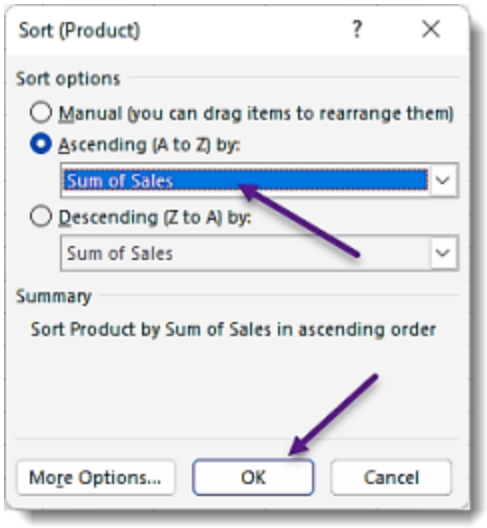
1. Click the "**Data**" tab in the ribbon.
2. Click the "**Sort**" button in the "**Sort & Filter**" section.



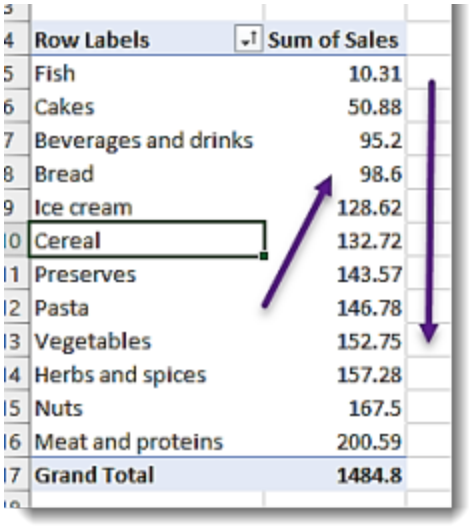
1. Choose the column you want to sort by from the "**Sort by**" drop-down list.
2. Choose the sorting order you want (either ascending or descending).



1. Select the item you want to sort from the list.



1. Click "**OK**" to apply the sorting to the Pivot Table.



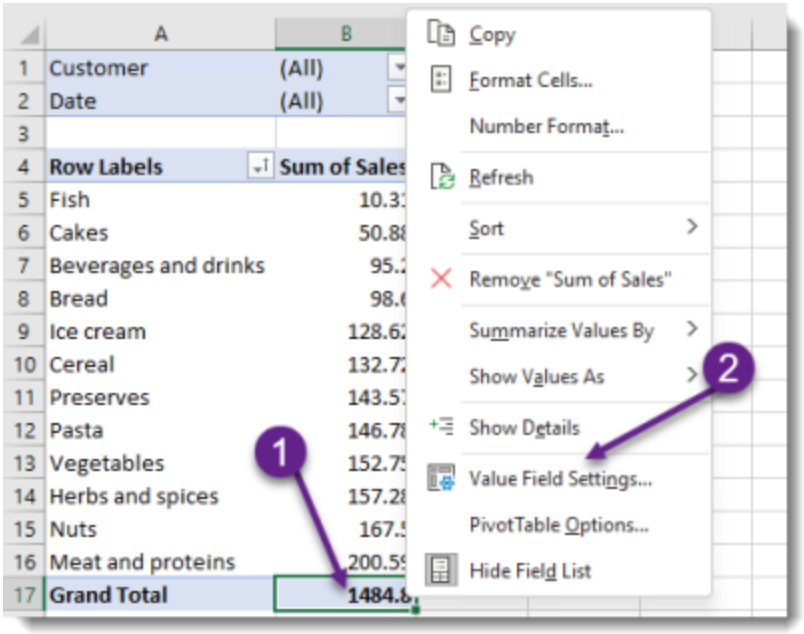
Row Labels	Sum of Sales
Fish	10.31
Cakes	50.88
Beverages and drinks	95.2
Bread	98.6
Ice cream	128.62
Cereal	132.72
Preserves	143.57
Pasta	146.78
Vegetables	152.75
Herbs and spices	157.28
Nuts	167.5
Meat and proteins	200.59
Grand Total	**1484.8**

When done, the column in focus will have its items sorted in ascending or descending order.

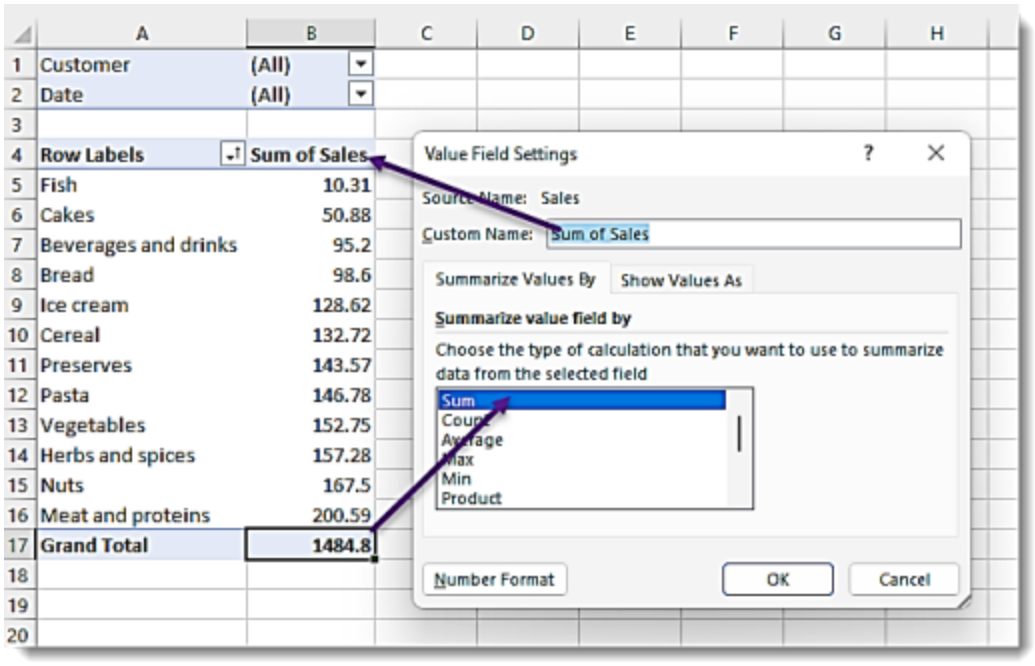
MODIFYING PIVOT TABLE CALCULATIONS

Modifying PivotTable calculations can be a valuable skill that enhances your data analysis capabilities. One of the easiest ways to do this is through the "**Value Field Settings**" dialog box.

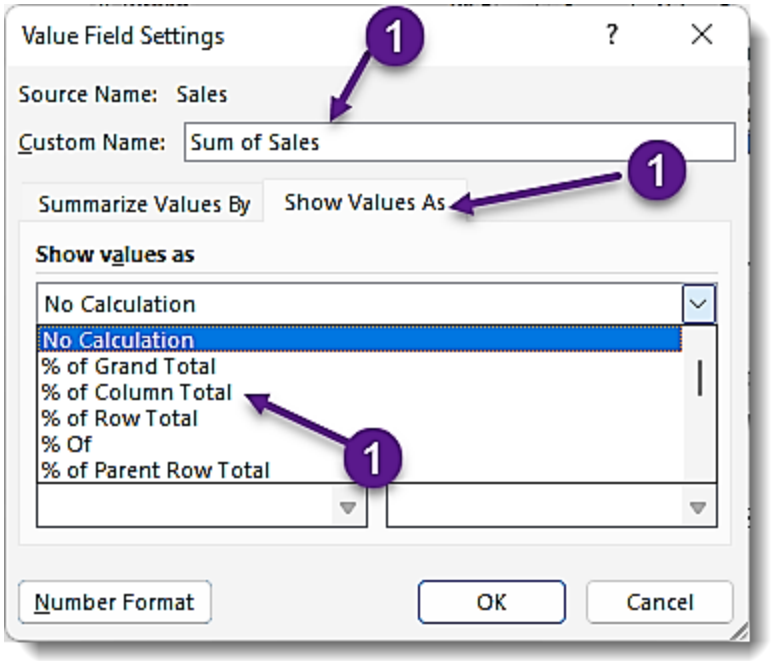
To access the dialog box, right-click the value you want to modify in your PivotTable and select "**Value Field Settings**" from the drop-down menu.



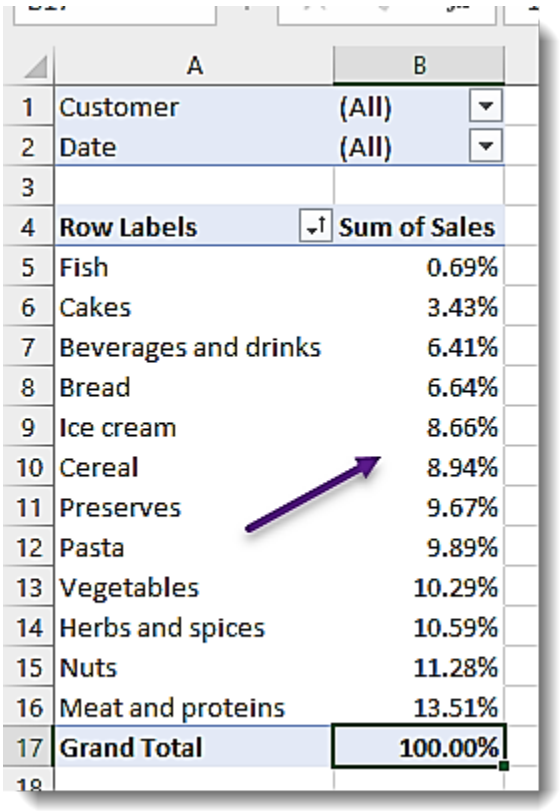
Once you do this, a new window will appear, allowing you to modify the calculation type, add filters, and adjust other settings.



For instance, if you want to view the total sales percentage for each product category rather than the actual sales figures, select the "**Show values as**" tab, and choose "**% of column total**" from the list of options.



This will alter the calculation for that column and display the percentage values instead of the initial sales data.



	A	B
1	Customer	(All)
2	Date	(All)
3		
4	**Row Labels**	**Sum of Sales**
5	Fish	0.69%
6	Cakes	3.43%
7	Beverages and drinks	6.41%
8	Bread	6.64%
9	Ice cream	8.66%
10	Cereal	8.94%
11	Preserves	9.67%
12	Pasta	9.89%
13	Vegetables	10.29%
14	Herbs and spices	10.59%
15	Nuts	11.28%
16	Meat and proteins	13.51%
17	**Grand Total**	**100.00%**

By experimenting and practicing, you can effectively use PivotTable calculations to extract valuable insights from your data, which can help you in making better business decisions.

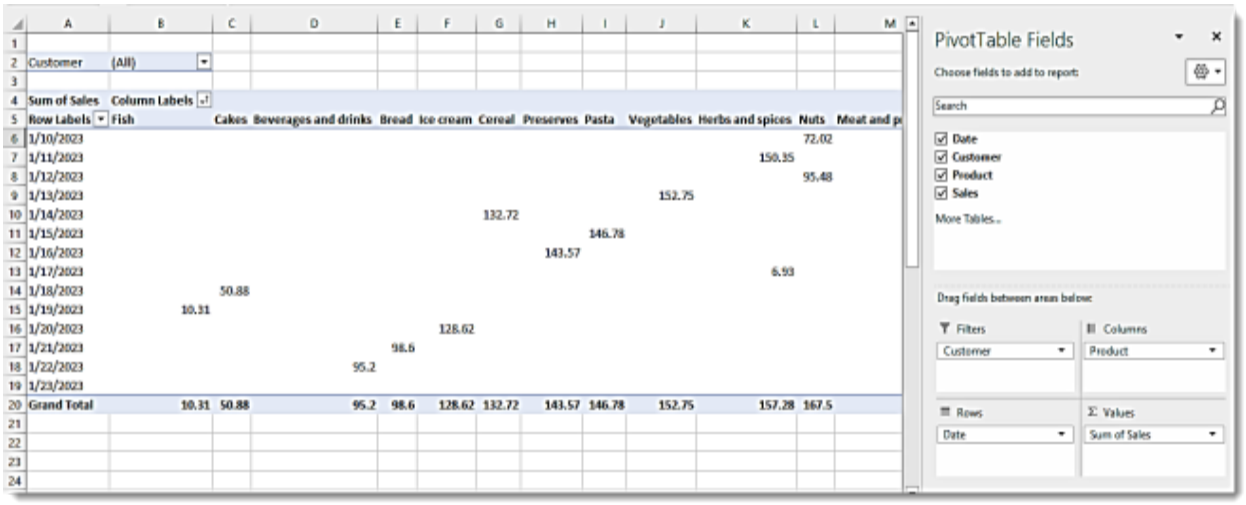
It's important to remember that making modifications to PivotTable calculations can have an impact on the accuracy of your data. It is crucial to carefully review your changes before finalizing them.

VIEW FIELDS AND AREAS SIDE-BY-SIDE

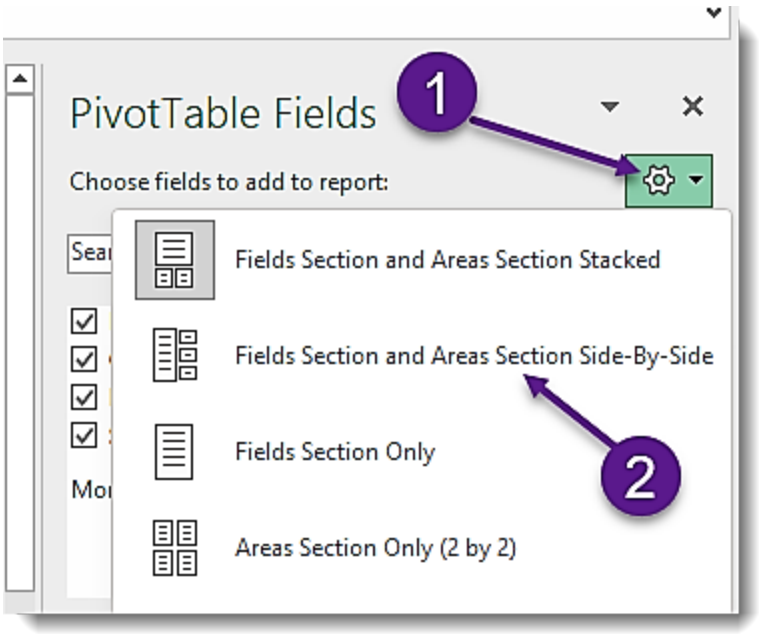
Viewing your fields and areas side-by-side is often helpful when using Pivot table field settings. This means you can see all the available data fields and the areas where you can drag and drop them to create different pivot views.

Having both fields and areas visible simultaneously allows you to quickly and easily drag and drop fields into different areas to create new pivot views.

For example, I could drag the "**product**" field into the "column" area to see a breakdown of sales by product or drag the "**date**" field into the "**row**" area to see how sales vary over time.



To view fields and areas side-by-side in a pivotable, click on the Settings icon and select **Fields Section and Areas Section Side-By-Side**.

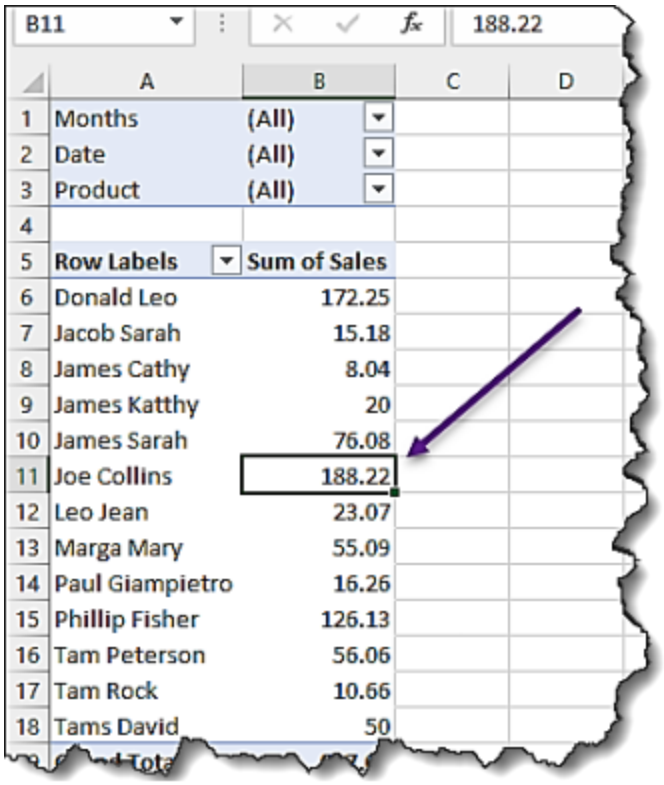


Once the fields and areas are visible, you can experiment with different pivot views to gain insights and make better decisions based on your data.

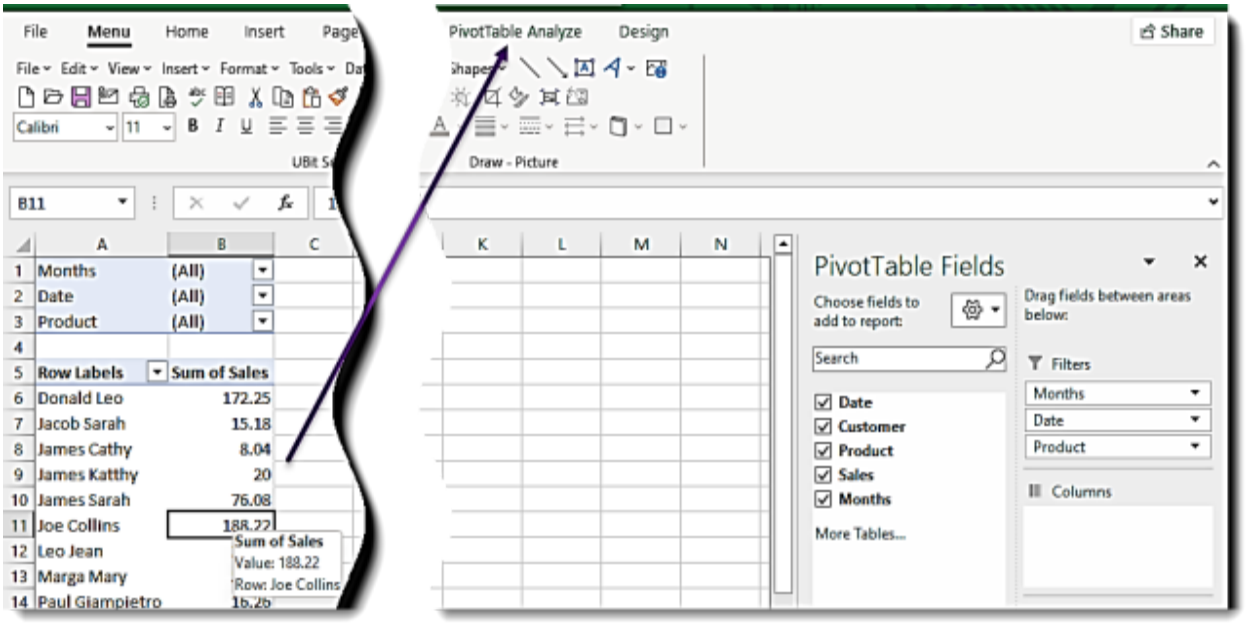
DISPLAY REPORT FILTER REPORT ON A SEPARATE WORKSHEET

The goal is to create a separate pivot table for every distinct item in a field.

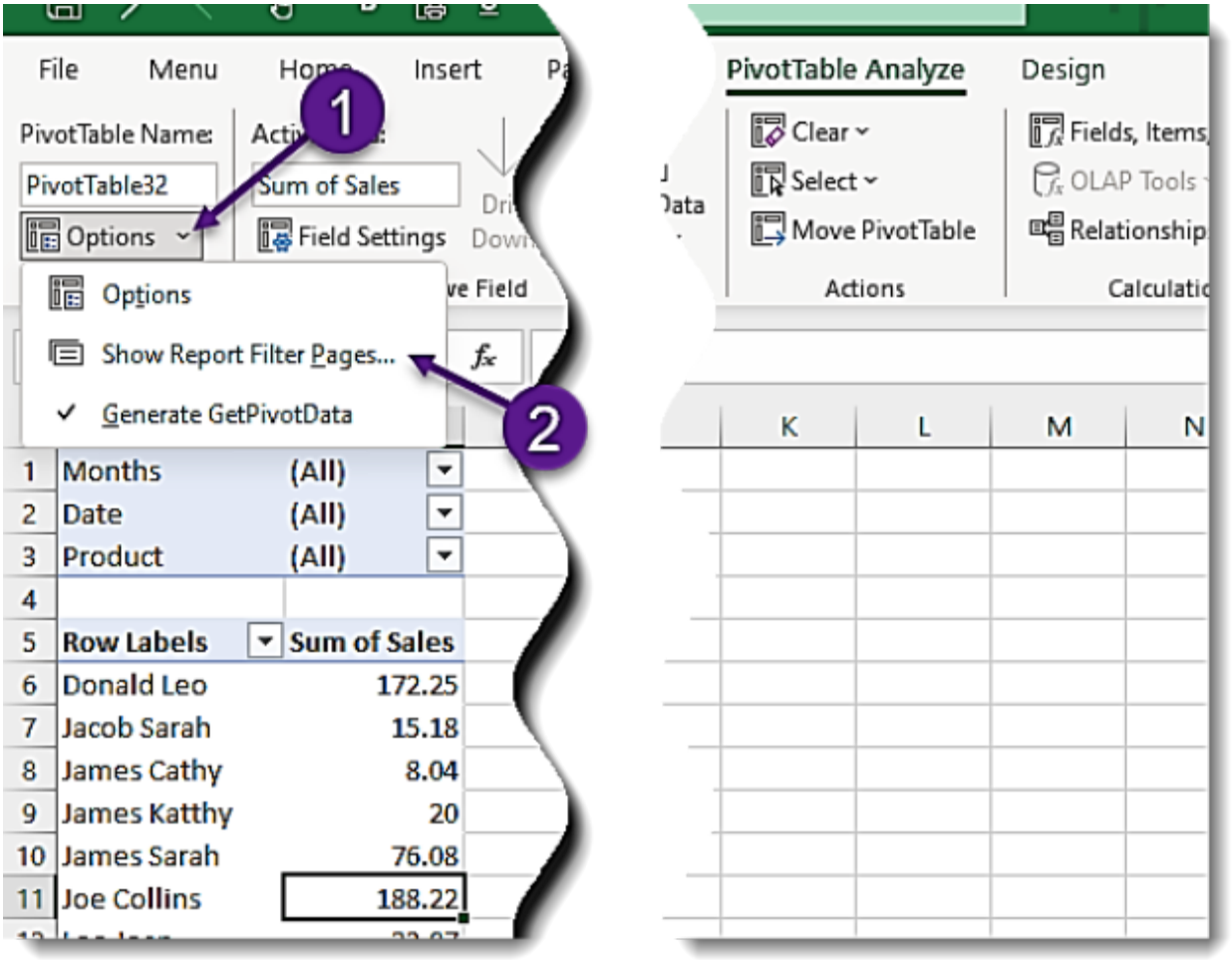
1. Click on any of the cells within the pivot table.



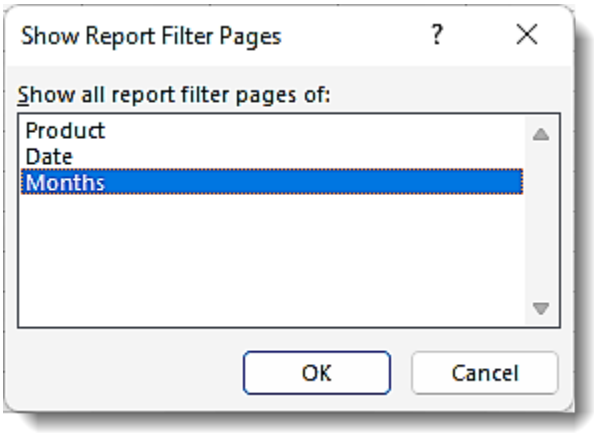
1. Click on the **PivotTable Analyze** contextual tab.



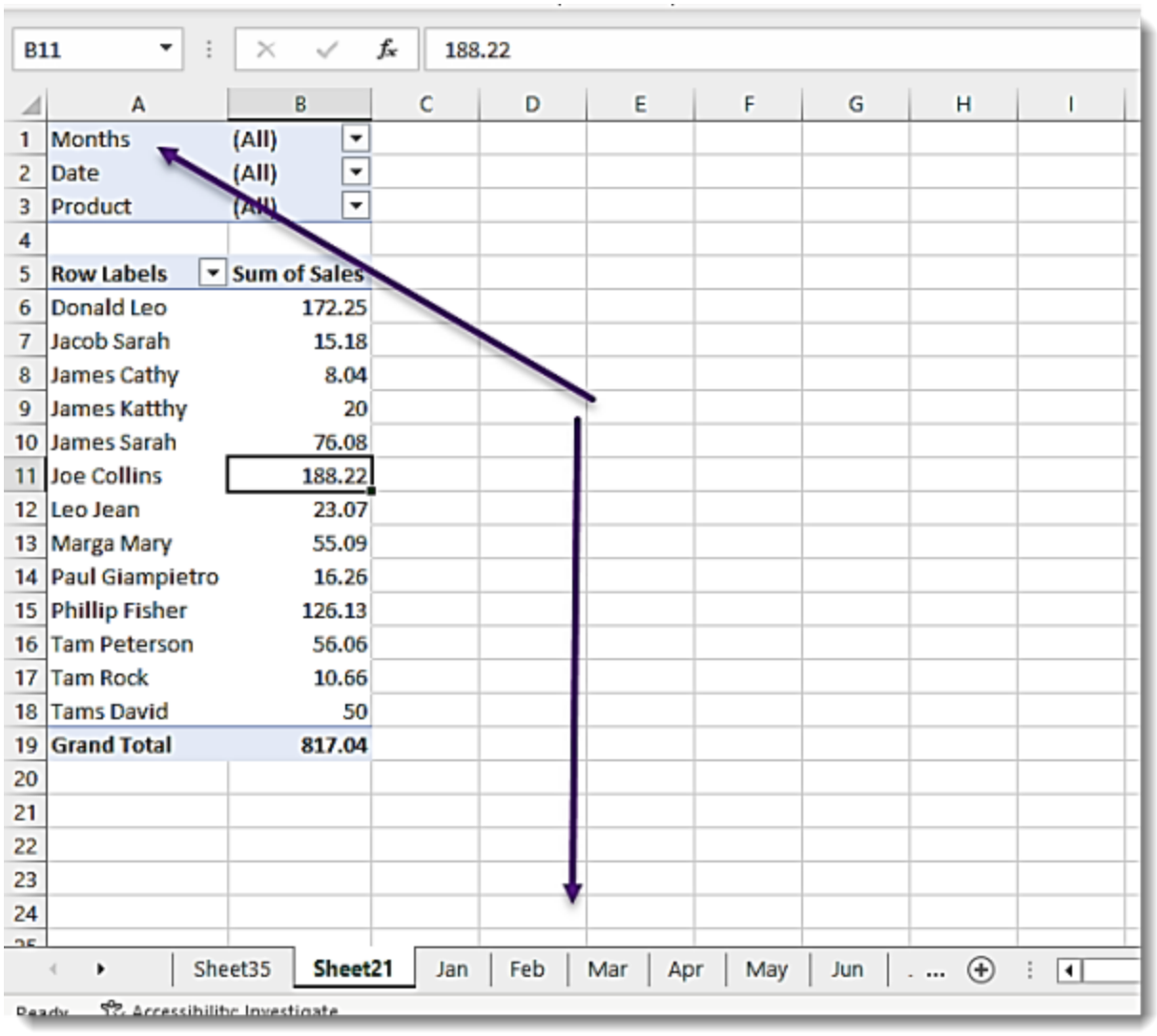
1. Locate the Options button in the PivotTable group to the right of your screen, and click on the drop-down arrow.



1. Next, click on **Show Report Filter Pages**.
2. From the **Show Report Filter Pages window**, select the field from the list of all the fields in the Filter Area of the pivot table you want to use to create the reports.



1. Then click on the **OK** button.



For every item on the list, Excel will generate a pivot table on a fresh worksheet that is filtered for that particular item, and Excel will rename the worksheet to correspond with the item name.

However, any modification you make to the original pivot table will not be updated in the pivot tables of new filter pages. If you want to modify all the reports' layout or style, removing all the filter pages (new worksheets) and creating the reports anew would be advisable.

To see details about the data in a pivotable, double-click on the value, and Excel will take you to another worksheet to help you better understand the

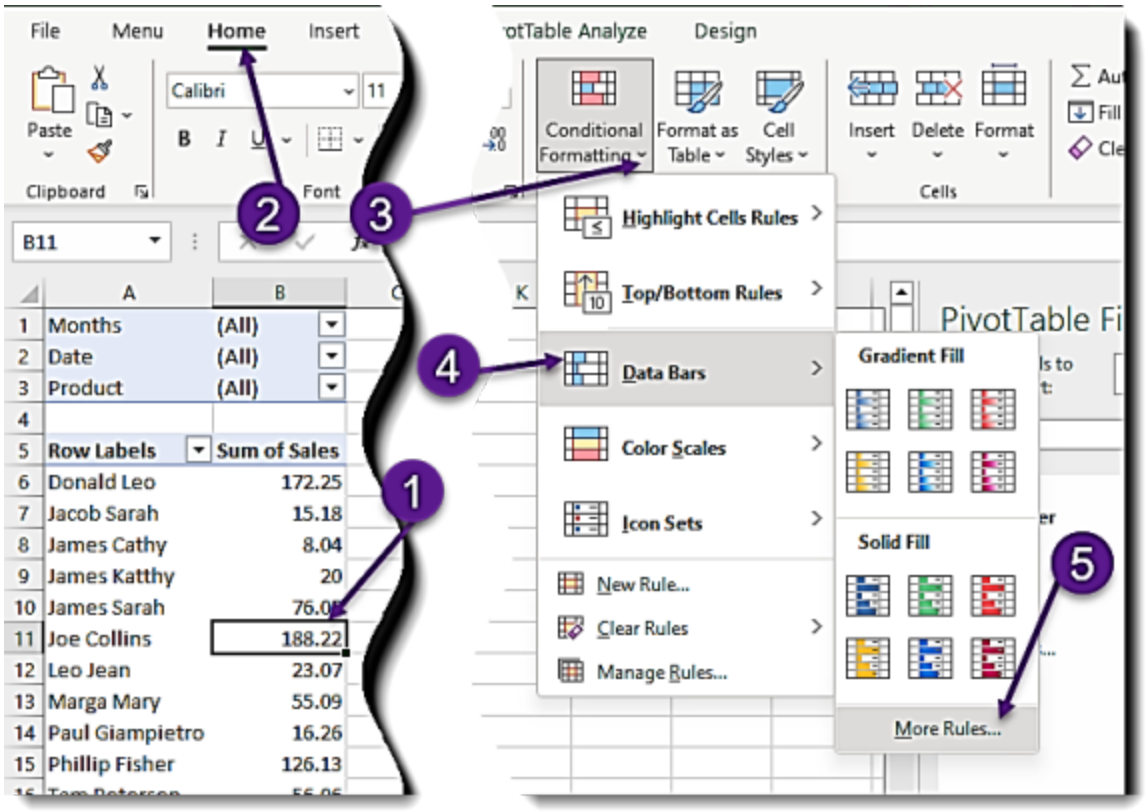
source of the data you are interested in.

ADD DATA BARS TO A PIVOT TABLE

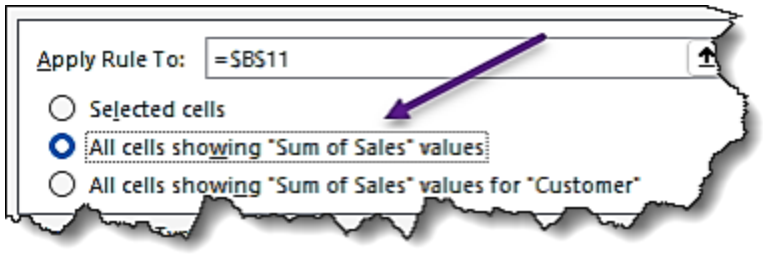
Data Bars are used in Excel a lot side a PivotTable to incorporate visual representations of data. These bars are a form of conditional formatting that utilize bars to indicate how the values in a range of cells are compared.

Follow these steps to add Data Bars to your Pivot Table:

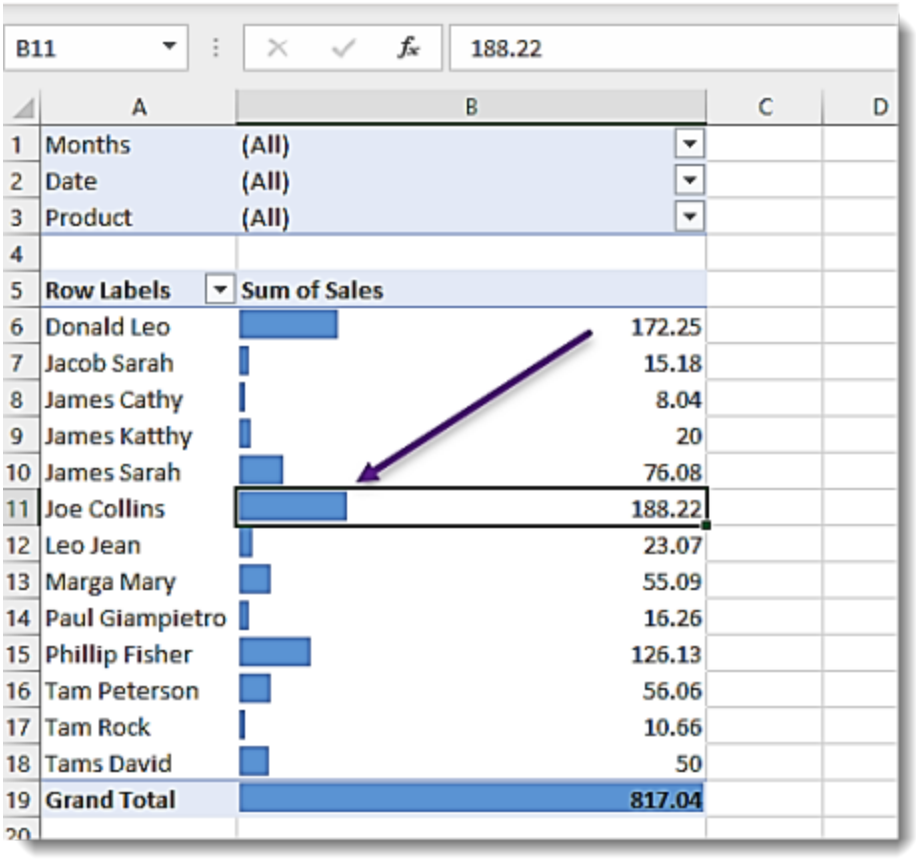
1. Click on any of the cells in the pivotable.
2. Go to the **Home** tab on the ribbon and click the **Conditional Formatting** button in the **Styles** group.
3. From the drop-down list, select **Data** Bars.
4. Next, click on **More Rules**



1. In the **New Formatting Rule,** click on **All Cells Showing "Sum of Sales" values**.

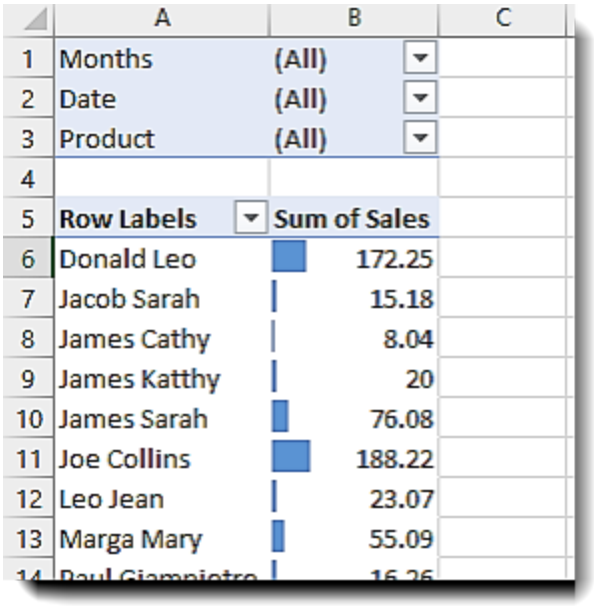


1. Click on the **OK** button. This will display the Bar beside the value.



Note: You will need to increase the column width to better view the bar. Once you right-click on the bar and refresh the worksheet, the column width

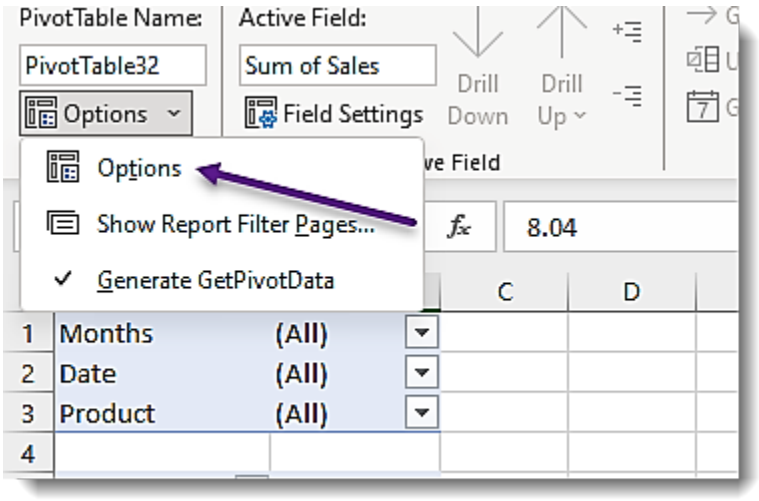
will collapse, making it difficult to see the bar.



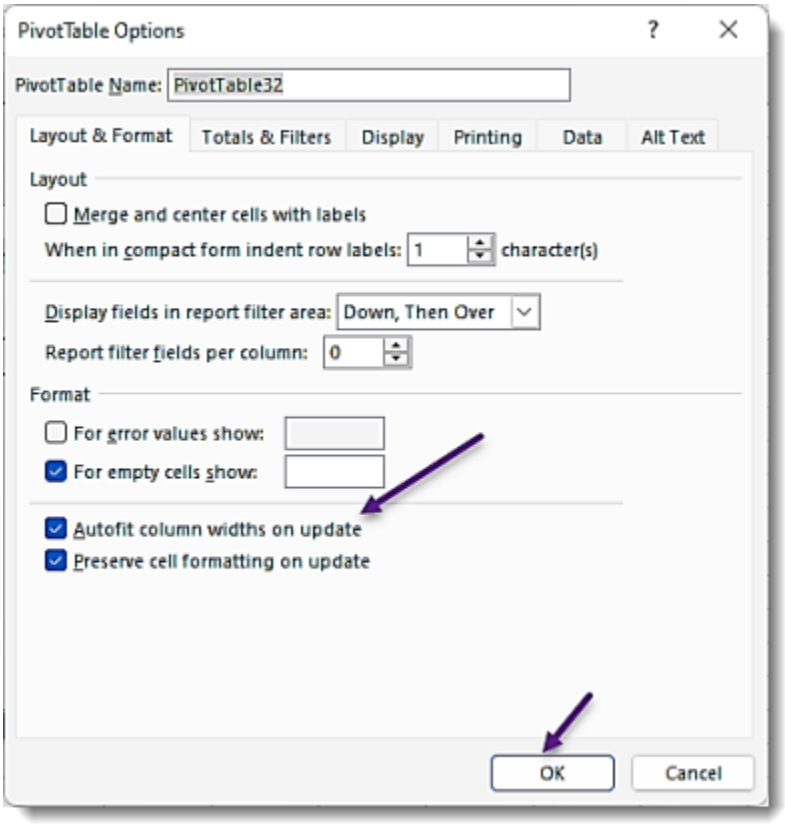
	A	B	C
1	Months	(All)	
2	Date	(All)	
3	Product	(All)	
4			
5	**Row Labels**	**Sum of Sales**	
6	Donald Leo	172.25	
7	Jacob Sarah	15.18	
8	James Cathy	8.04	
9	James Katthy	20	
10	James Sarah	76.08	
11	Joe Collins	188.22	
12	Leo Jean	23.07	
13	Marga Mary	55.09	
14	Paul Giampietro	16.26	

Excel's default setting for PivotTables is to have dynamic column width, which is the reason behind this.

To make the column width static, go to the **PivotTable Analyze** bar on the ribbon, click on the **Options** button in the **PivotTable** group to the right of your screen, and click on the drop-down arrow. Then click on **Options**.



Next, uncheck the **AutoFit column widths on update**, and click the **OK** button.



With this adjustment, the bar will not collapse when you refresh the pivotable.

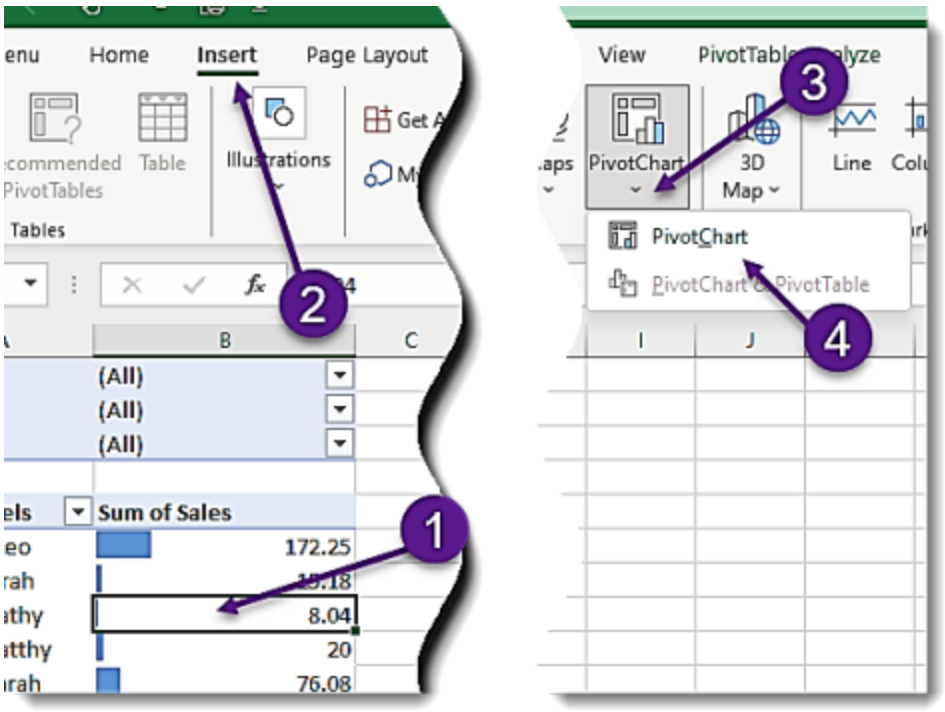
Choose the color and style of the Data Bars that you want to use.

CREATING PIVOT CHARTS

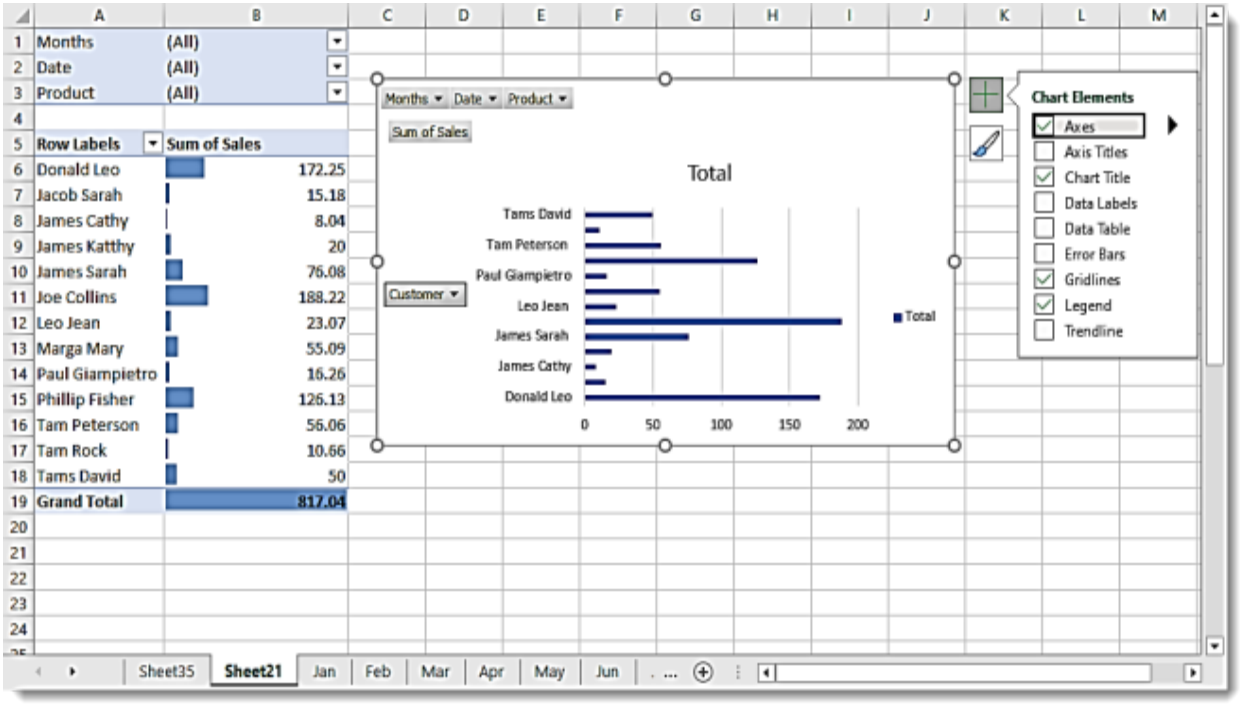
A pivot chart is a visual representation of data from a pivot table in Excel. It allows you to summarize and analyze large amounts of data in a graphical format.

Once you have your pivot table ready, follow these steps to create a pivot chart:

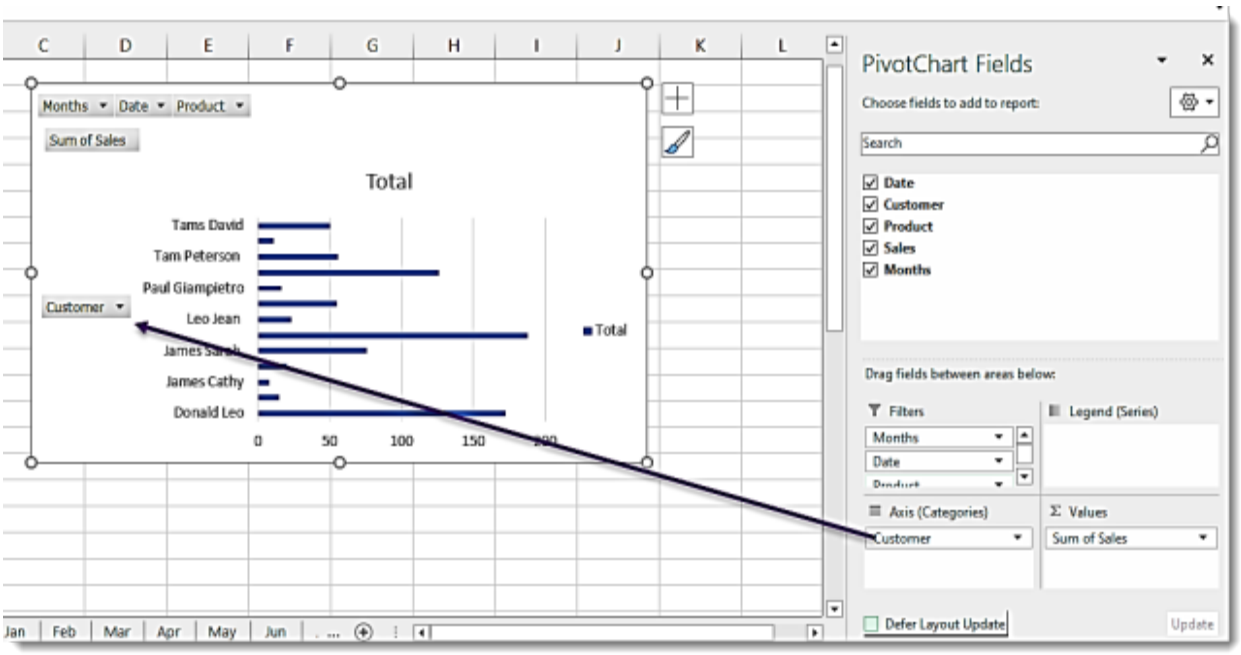
1. Click on any cell within the pivot table.
2. Go to the **Insert** tab on the ribbon.
3. Click on **Pivot Chart** and select the type of chart.



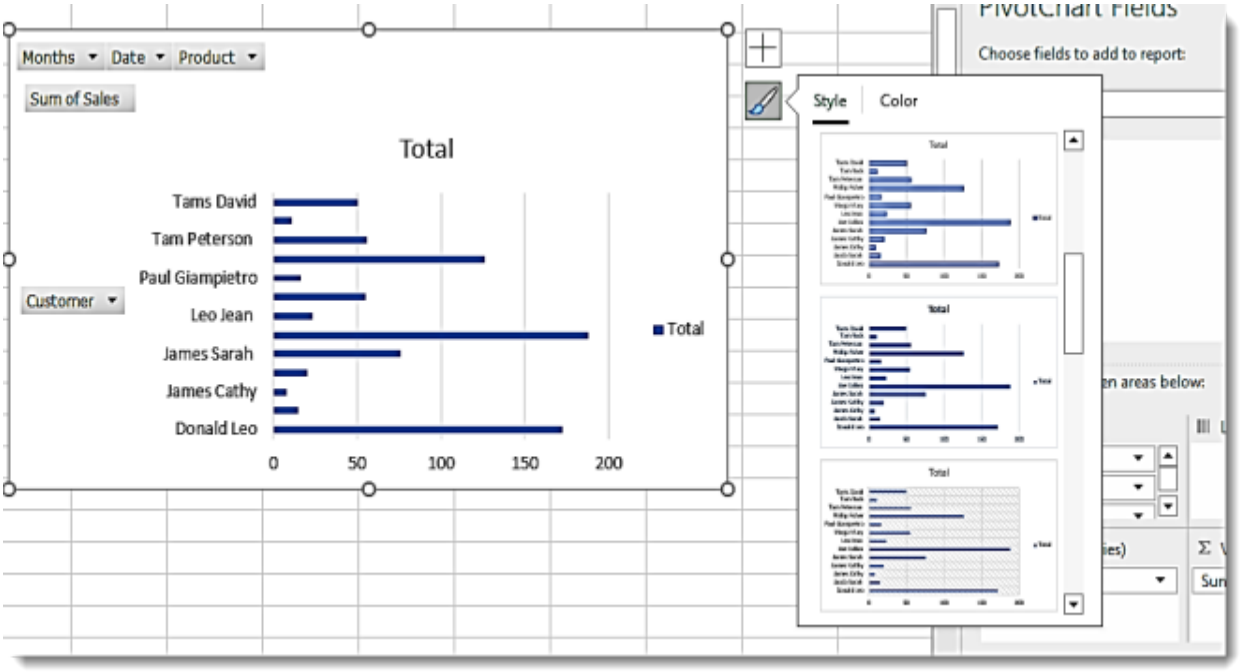




The pivot chart also has its PivotChat Field panel, where you can drag and drop the fields you want to include in the pivot chart.


C
D
E
F
G
H
I
J
K
L
Months
Date
Product
Sum of Sales
Total
Tams David
Tam Peterson
Paul Giampietro
Leo Jean
James Sarah
James Cathy
Donald Leo
Customer
Total
0
50
100
150
200
Jan
Feb
Mar
Apr
May
Jun
PivotChart Fields
Choose fields to add to report:
Search
Date
Customer
Product
Sales
Months
Drag fields between areas below:
Filters
Legend (Series)
Months
Date
Axis (Categories)
Values
Customer
Sum of Sales
Defer Layout Update
Update

Customize the appearance of the chart by using the chart elements and styles.



LESSON 15

PROTECTING EXCEL WORKSHEETS AND WORKBOOKS

Protecting your workbooks, worksheets, and cells is crucial to maintaining the integrity of your spreadsheet and reducing errors. Imagine spending a lot of time creating a complex spreadsheet that works well, is easy to update, and looks great. You share it with your team, but mistakes start creeping in. Formulas are accidentally edited or deleted, links are broken, and the formatting is ruined. This can frustrate you as the creator and create unnecessary work as you have to go back and fix these errors. However, you can prevent this by taking simple steps to protect your worksheet and data.

PROTECTING THE ENTIRE WORKBOOK

If you want to protect your workbook, there are three options you can consider. Firstly, you can **encrypt** it with a password. This means that only one with the password can open the workbook.

Secondly, you can make the file open as **read-only** by default. This means that people can view the workbook but cannot edit it unless they choose to do so.

Finally, you can **protect the structure** of the workbook. This means that anyone can open the workbook, but they need a password to do anything related to the structure, such as deleting worksheets, rearranging them, renaming them, or creating new worksheets.

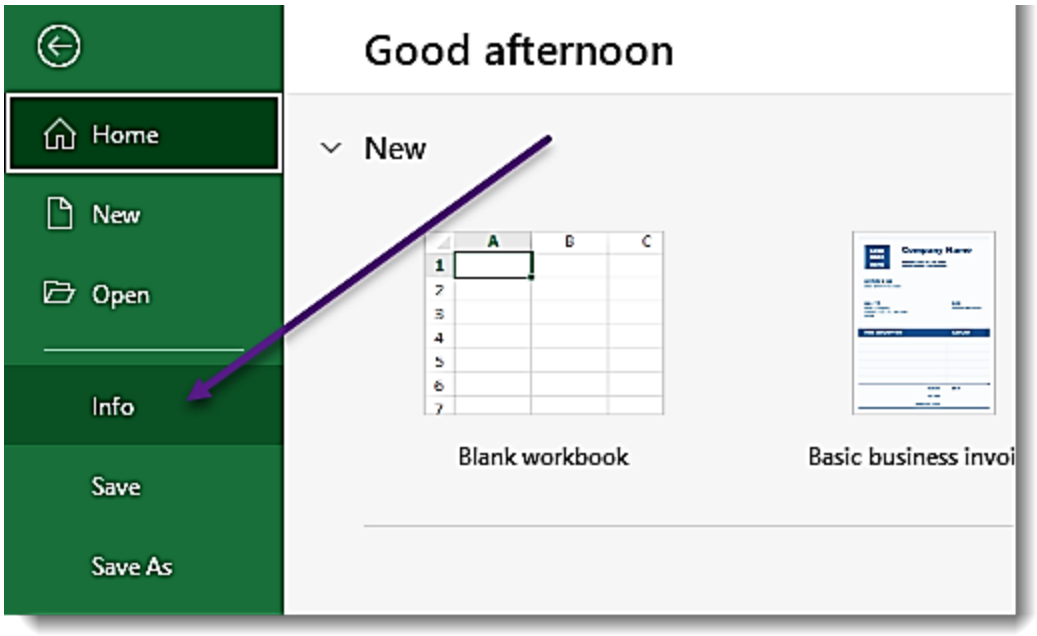
By using these options, you can restrict access to your workbook and protect its contents from unwanted changes. It's important to carefully consider which option is right for you based on your needs and requirements.

ENCRYPTING THE ENTIRE WORKBOOK

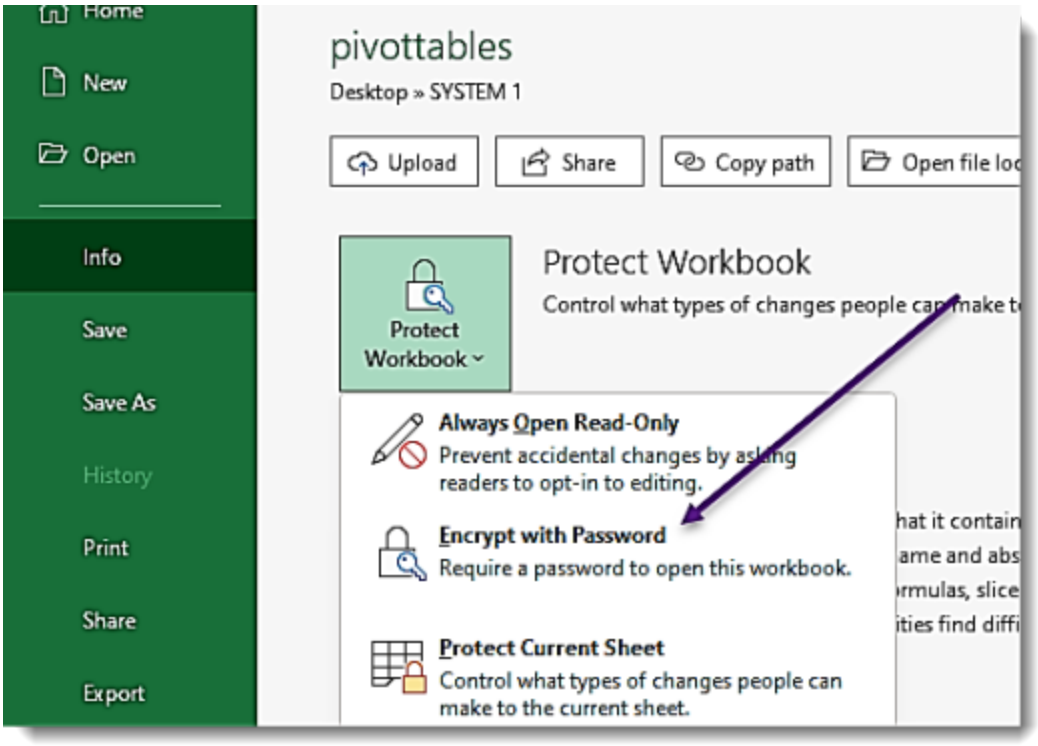
As I said earlier, when you encrypt an entire workbook in Excel, you secure it with a password, limiting access to authorized users only. This is particularly crucial when the workbook holds confidential data that you wish to keep from unauthorized individuals.

Follow the steps below to encrypt an entire workbook in Excel:

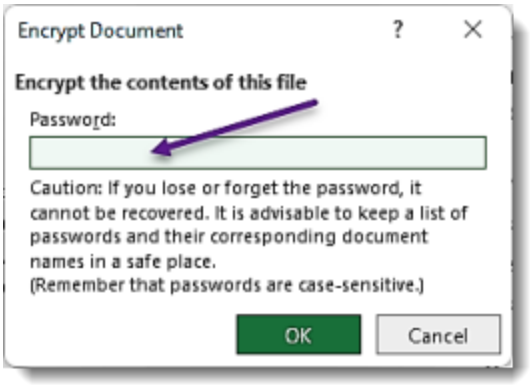
1. Ensure the workbook is open.
2. Click on the **File** tab.
3. On the File tab, click on **Info**.



1. Click on the **Protect Workbook** drop-down arrow and select **Encrypt with Password**.

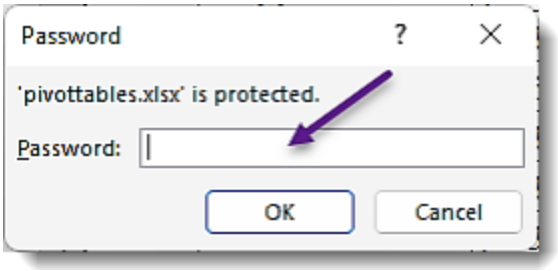


1. Next, enter a strong password you can remember easily.



1. Click on the **OK** button to reenter the same password again, then click on the **OK** to complete the process.
2. Save the changes made to the workbook

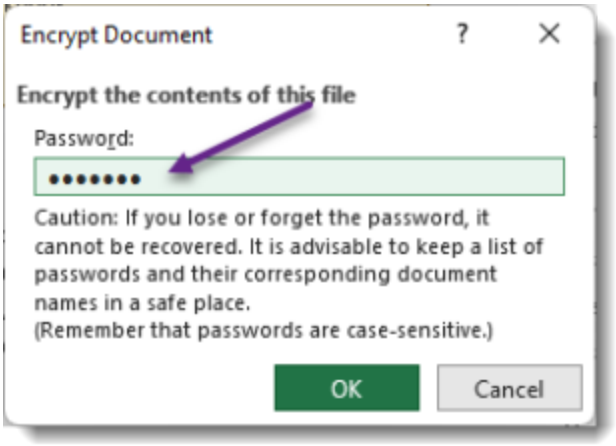
After you have encrypted the workbook, whenever anyone tries to open it, they will need to enter your set password.



This provides an extra layer of security and protects your sensitive data from unauthorized access.

HOW TO REMOVE A PASSWORD

To remove a password from a workbook, follow the steps you took to add the password. When you get to the Encrpty Document dialog box, you only need to delete the password and click the **OK** button.

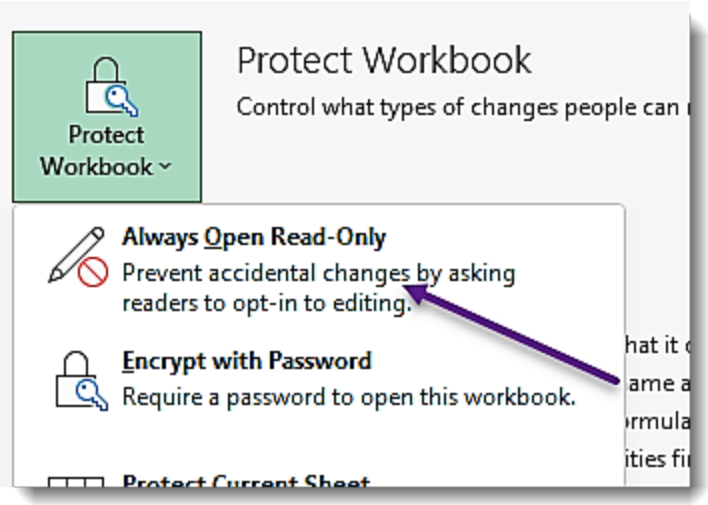


SET THE WORKBOOK AS READ-ONLY

To set your workbook as read-only means preventing any modifications from being made to the file. This can protect the workbook's contents from accidental or unauthorized changes. However, this is a low-security measure, as anyone can still view the workbook.

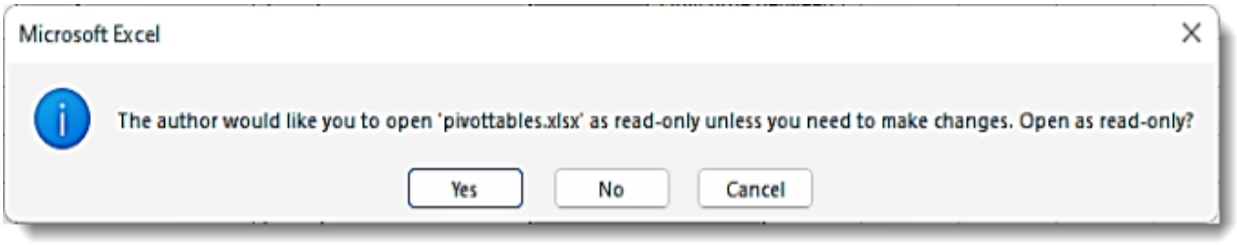
Follow these steps:

1. Ensure the workbook is open.
2. Click on the **File** tab n the ribbon.
3. Click on **Info**.
4. Click on the **Protect Workbook** drop-down button.
5. Click on **Always Open Read-Only**.



1. Save the workbook and close it.

You will get a message when you try to open the workbook again.

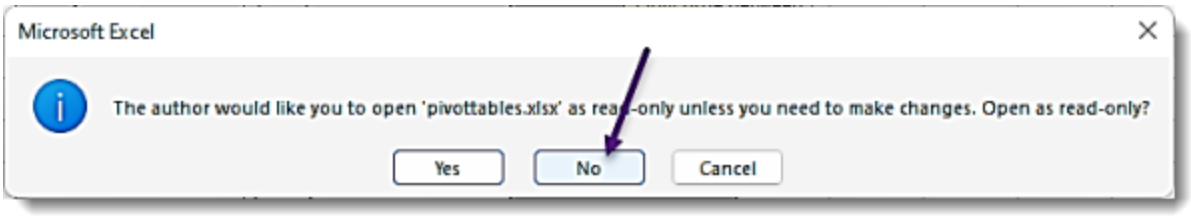


Anyone else trying to open the workbook will either accept to view it as a read-only by clicking on the **Yes** button or the **No** button to view the file without protection. This is why you must consider using the read-only method to protect your workbook.

PROTECTING THE STRUCTURE OF A WORKBOOK

Protecting the structure of a workbook is vital to prevent accidental or intentional changes that could harm the integrity of the data. This is especially important when multiple users are working on the same workbook, as changes made by one person can affect the work of others.

The Read-only access allows anyone who has access to your workbook to view the workbook but does not stop them from going further to make changes because they can still override the read-only settings. This is possible when opening the workbook by clicking on the **No** button.



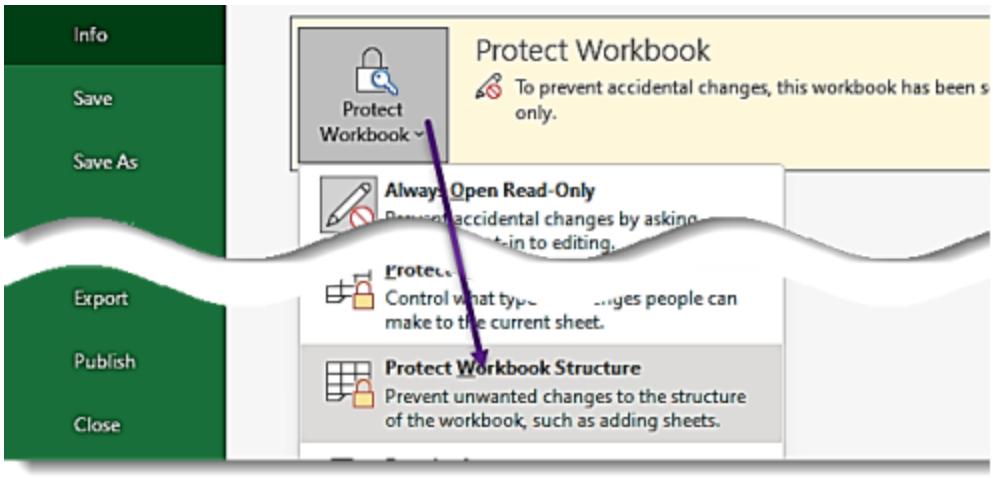
I don’t recommend using the read-only method for workbooks containing confidential data.

Protecting the workbook's structure means preventing someone else from deleting the worksheet, moving the worksheet, renaming a worksheet, and inserting a worksheet.

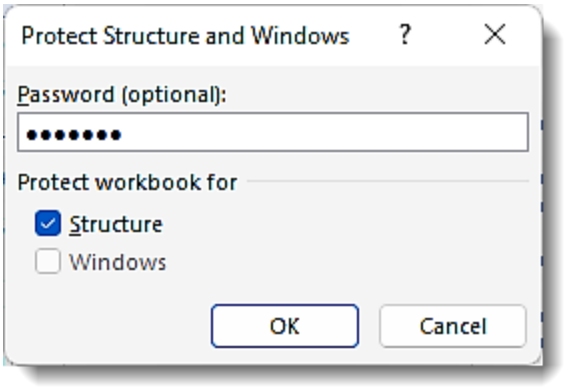
Follow the steps below to achieve this result:

1. Click on the File tab on the ribbon.
2. Click on **Info.**
3. Click on the **Protect Workbook** drop-down menu arrow.

4. Select **Protect Workbook Structure.**



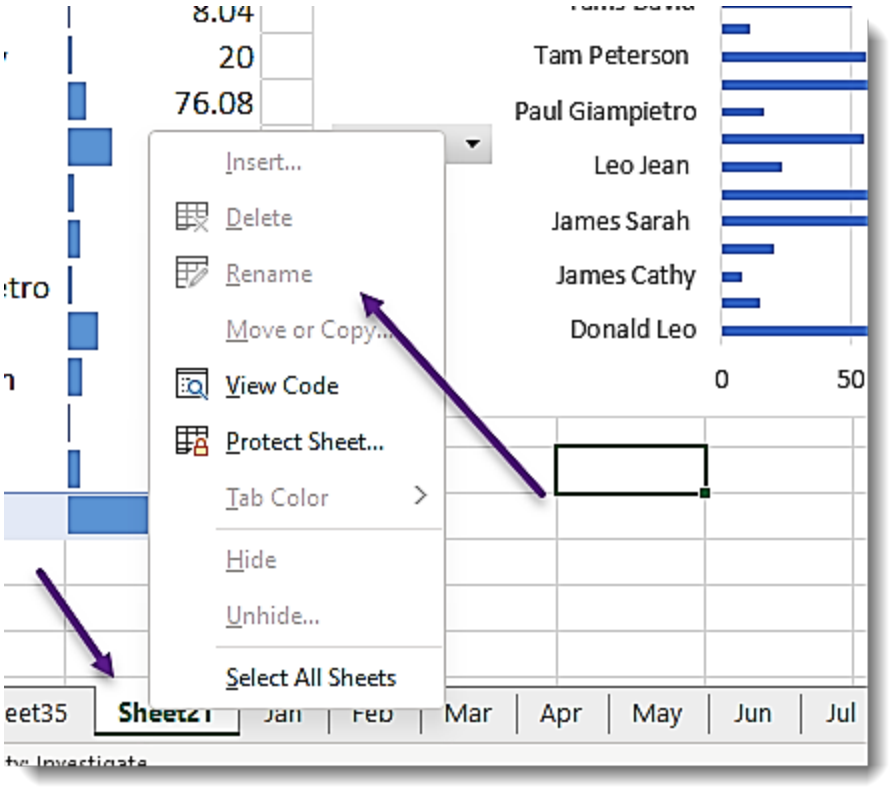
1. Enter a password you can rememeber.



1. Click on the **OK** button and reenter the password again. Click on the **OK** button when done. Save the workbook.

To confirm the process worked. Try to rename, copy or move the worksheet you are currently working on, and you will notice the features are not

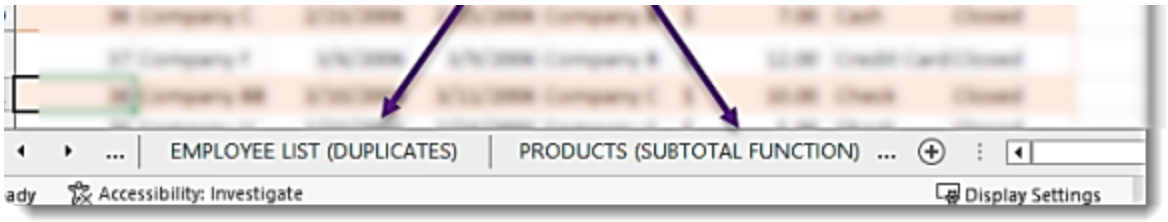
enabled.



To carry out any modification to the workbook structure, the user will have to enter the password.

PROTECTING A WORKSHEET

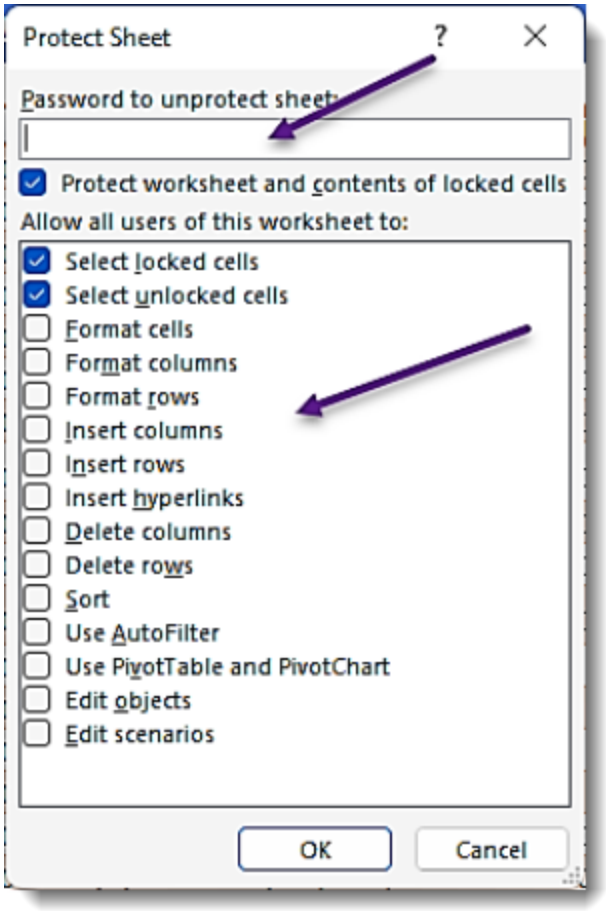
Protecting the worksheets refers to the individual tabs at the bottom of a workbook.



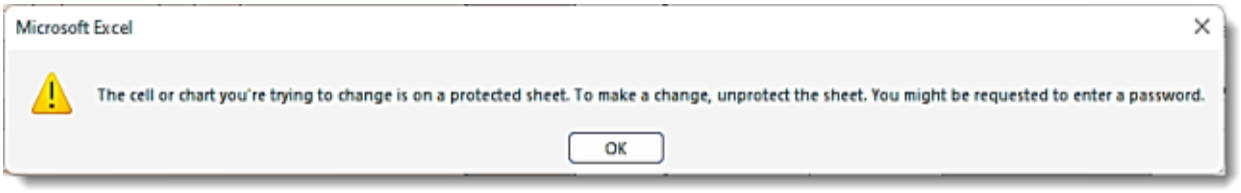
These tabs contain the various sheets that make up the workbook. By organizing your data into different worksheets, you can better categorize and manage your information. You can decide to protect a particular worksheet from being modified.

To do this, follow the steps below:

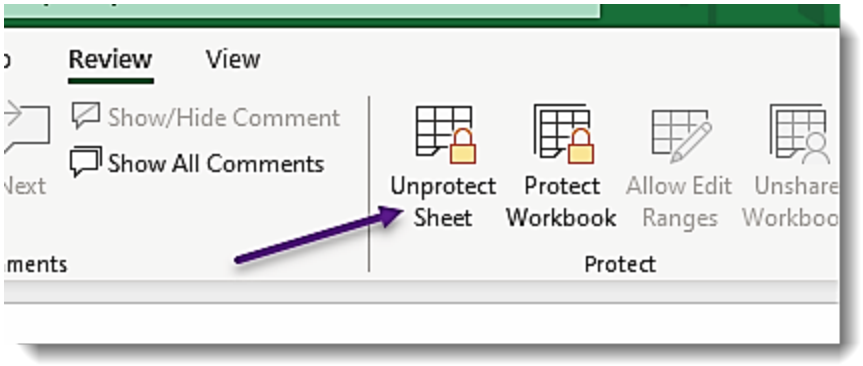
1. Click on the sheet to make it active.
2. Go to the **Review** tab on the ribbon.
3. In the **Protect Group**, click on the **Protect Sheet** button.
4. Enter the **Password** and then enable the features you want to allow any user to access the worksheet. Else you uncheck all for only to view.



Whenever a user tries to carry out any restricted task on the worksheet, Excel will display a message.



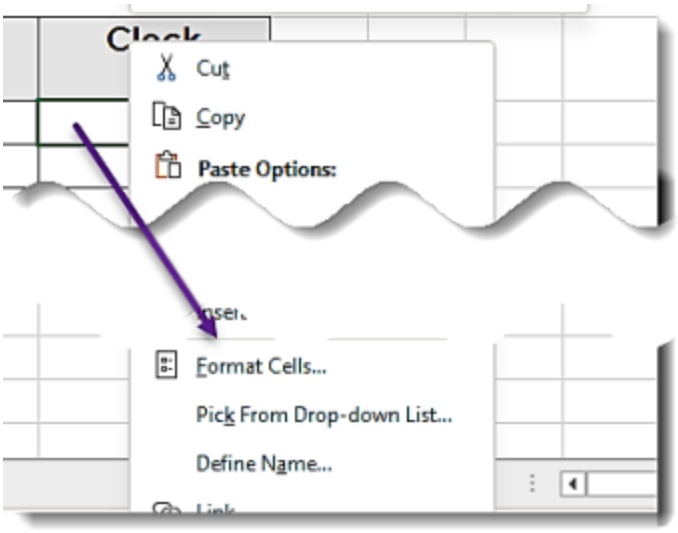
The worksheet needs to be unprotected for you to carry out any modification.


Review
View
Show/Hide Comment
Show All Comments
Unprotect Sheet
Protect Workbook
Allow Edit Ranges
Protect

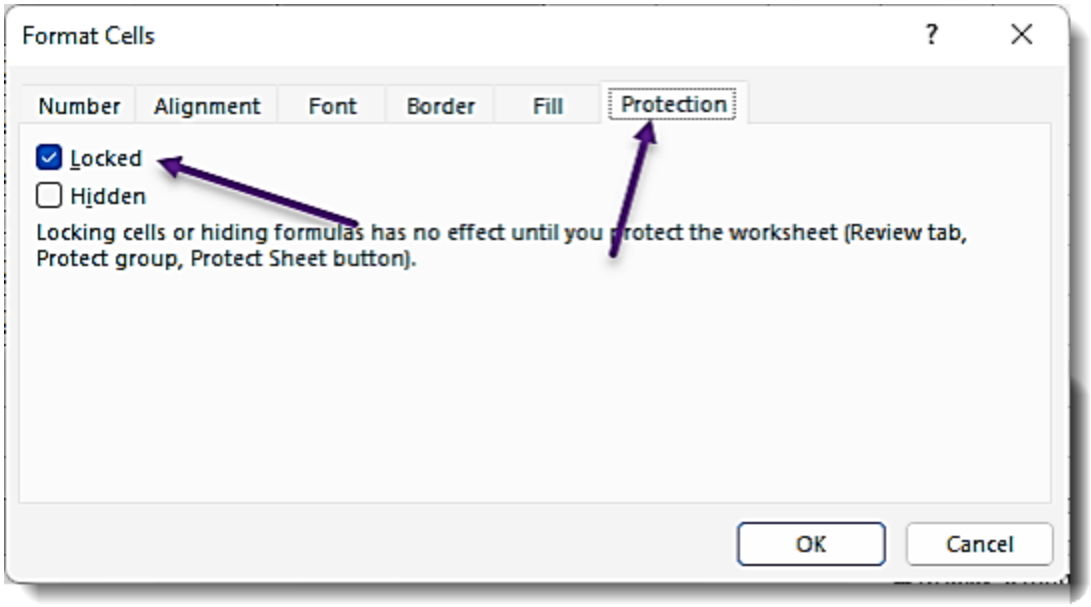
PROTECTING SPECIFIC CELLS WITHIN A WORKSHEET

Protecting a specific cell within a worksheet means restricting access to that cell so that someone else cannot edit, delete, or modify it. This can be useful when you want to keep certain information secure or prevent accidental changes.

However, the process used in locking cells in excel is quite tricky. Because, by default, all cells in Excel are locked. To Confirm this, right click on any cell and click on the **Format Cells.**

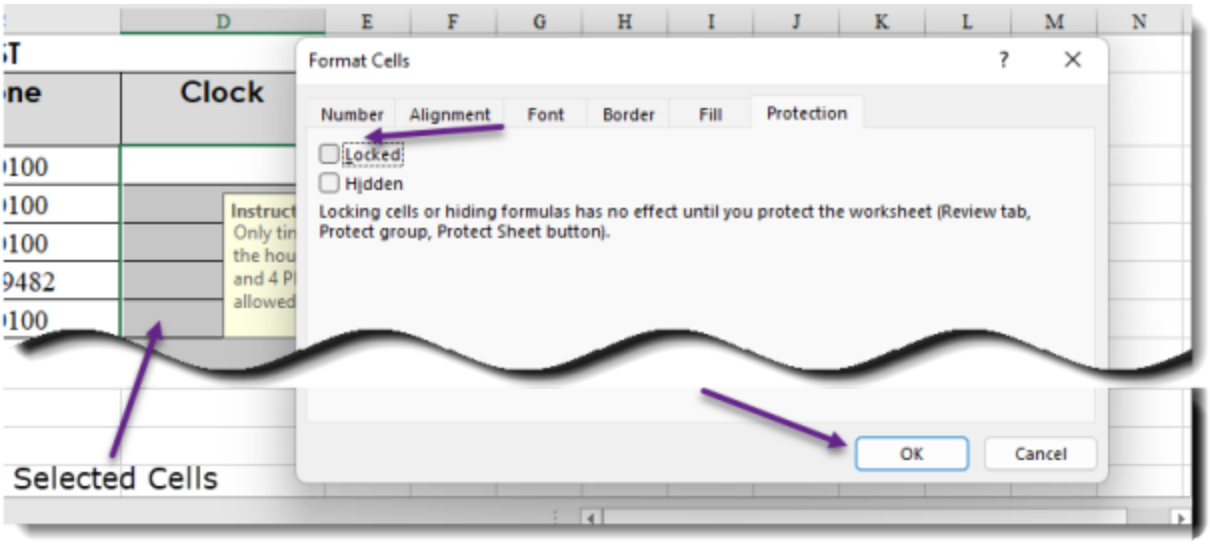


Under the Protection tab in the Format Cells dialog box, shows that the cell is already locked.



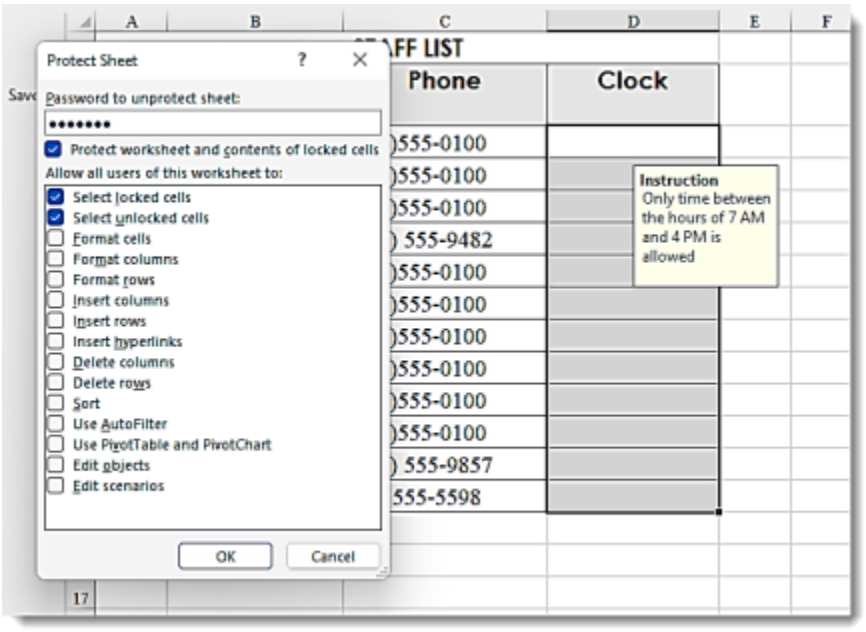
So follow the steps below to successfully Protect the cells you want.

1. Select the cell or range of cells you want to apply restriction.
2. Right-click on the selected cell(s) and click on **Format Cells**.
3. In the **Format Cells** dialog box, click on the **Protection** tab and uncheck the Locked box ".



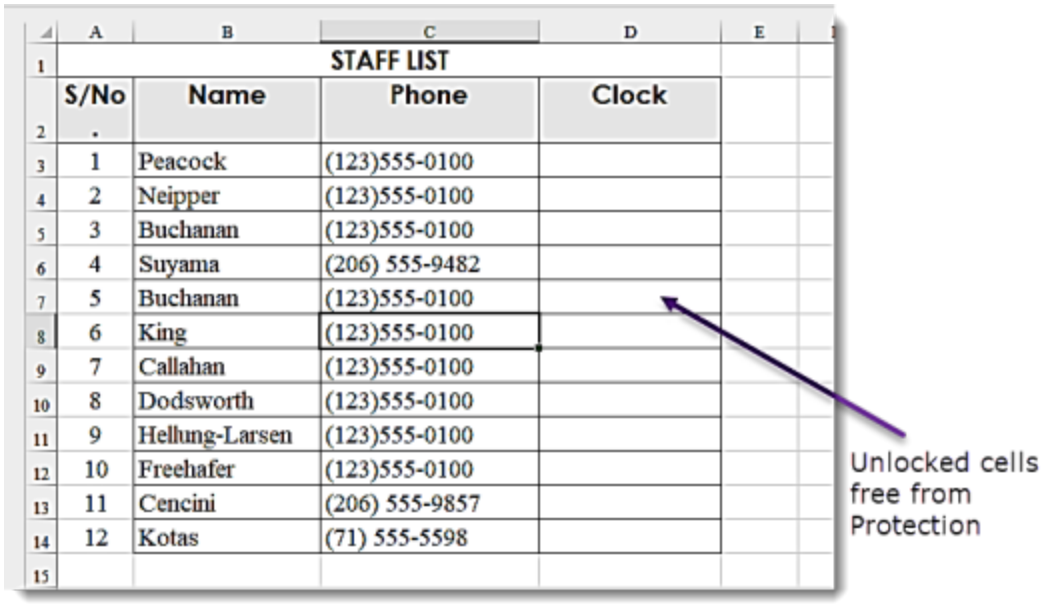
This means the area you selected and unlocked is free from any default setting. So if you Protect the worksheet, these cells won't be affected.

1. Click the **OK** button to close the dialog box.
2. The next step is to protect the worksheet. Click on the **Review** tab in the ribbon, then click **Protect Sheet**.



In the **Protect Sheet** dialog box, enter a password you can remember and select the options for the protection of the worksheet, including whether someone else can choose locked cells or not.

1. Click the **OK** button, reenter the password, and then click on **OK** to protect the worksheet.



Following these steps, you can unlock a specific cell (s) and protect the other part of the worksheet from unauthorized access to help keep your data safe and secure.

LESSON 16

INTRODUCTION TO MACROS IN EXCEL

A **Macro** in Excel is a little helper you can create and customize for many tasks. Once you have created it, you can give it a name, save it, and use it repeatedly. It works by recording all the clicks and keystrokes you make while performing a specific task and replaying them whenever you run the macro. This can save you a lot of time if you have to do the same thing repeatedly, like manipulating data or generating reports.

You have a couple of options for recording and running macros in Excel. You can use the built-in Excel commands or Excel VBA, short for Visual Basic for Applications. VBA is a programming language that's pretty easy to use, and you can access it through the Excel Visual Basic Editor, which you can find on the DEVELOPER tab in the Excel Ribbon.

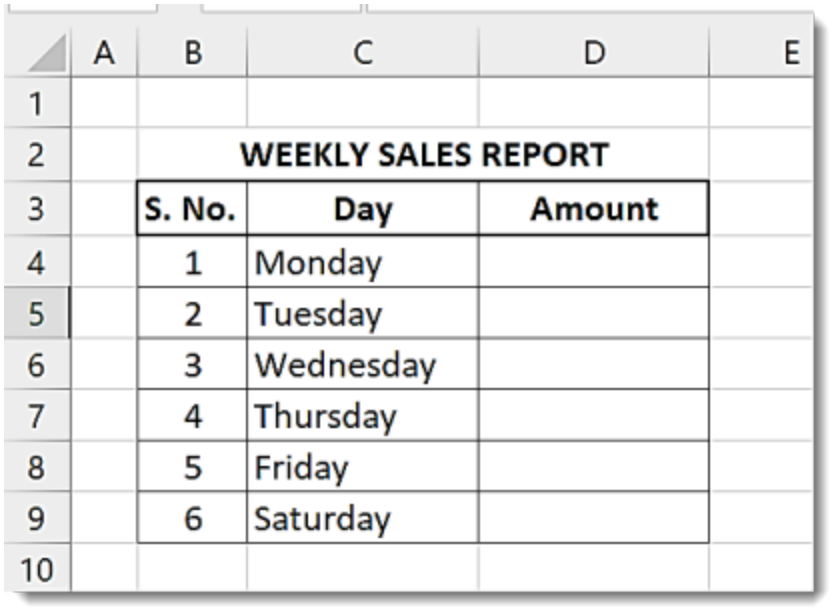
When you start to record a macro using Excel, it will generate a VBA code for you. If you are happy with how your macro works and don't need to make any changes, you don't need to know anything about VBA. Nevertheless, if you need to make any changes to your macro, you must work with the Excel Visual Basic Editor codes.

If you're new to macros, don't worry – I will walk you through recording a simple macro using Excel commands in this **Lesson 16.**

CREATING A MACRO IN EXCEL

You can easily create a macro by recording your keystrokes and mouse clicks. Once done, you must assign the macro a name and choose where to store it. Then, you can run the macro anytime you want using an Excel command.

Let's say you must repeatedly gather specific results each time they need to be in the same format. For example, using the table below, you don't have to create the table from scratch every time. You can use a macro to do it for you automatically.

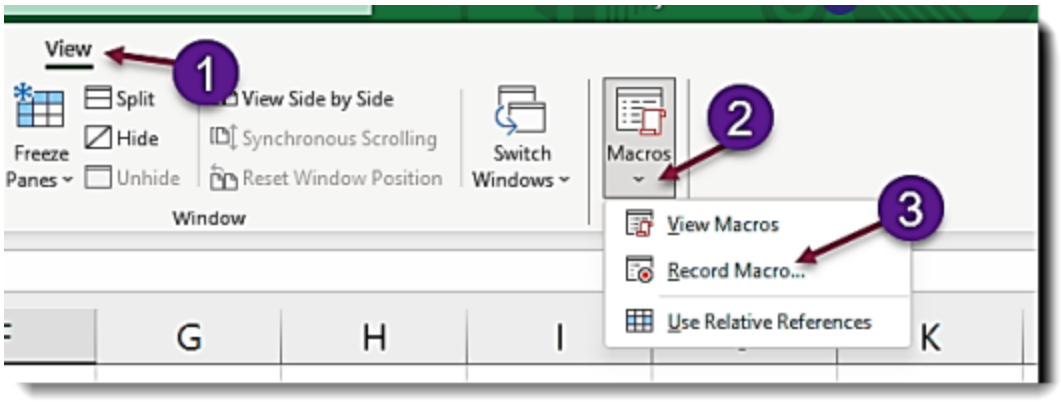


	A	B	C	D	E
1					
2		WEEKLY SALES REPORT			
3		S. No.	Day	Amount	
4		1	Monday		
5		2	Tuesday		
6		3	Wednesday		
7		4	Thursday		
8		5	Friday		
9		6	Saturday		
10					

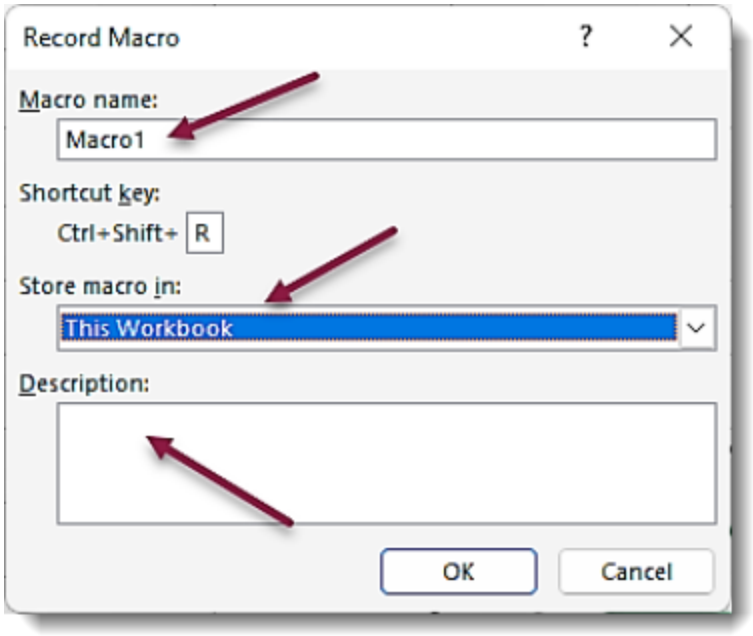
RECORDING YOUR FIRST MACRO IN EXCEL

Follow these steps to record a macro in Excel:

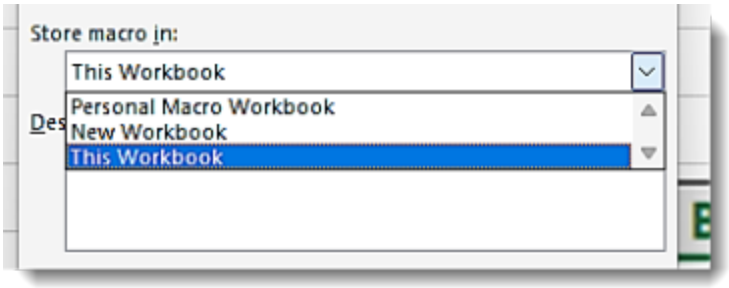
1. Open the workbook you want to record the macro.
2. Go to the "**View**" tab in the Ribbon, click the "Macros" drop-down arrow, and select **Record** Macros.



1. In the "**Record Macro**" dialog box, assign a name to your macro, and if you like, set a shortcut key, and choose where you want to store the macro.



- The shortcut key **Ctrl + Shift + R** was created by pressing the **Shift** and **R** key.
- The **Store macro in** the drop-down menu gives you three options.



- **This Workbook**

When created, the macro will be saved in your current workbook by default.

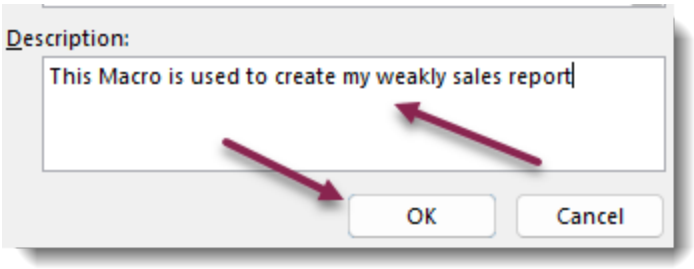
- **New Workbook**

Excel will save your macro in a new workbook, but it's unnecessary and, honestly, not the best option.

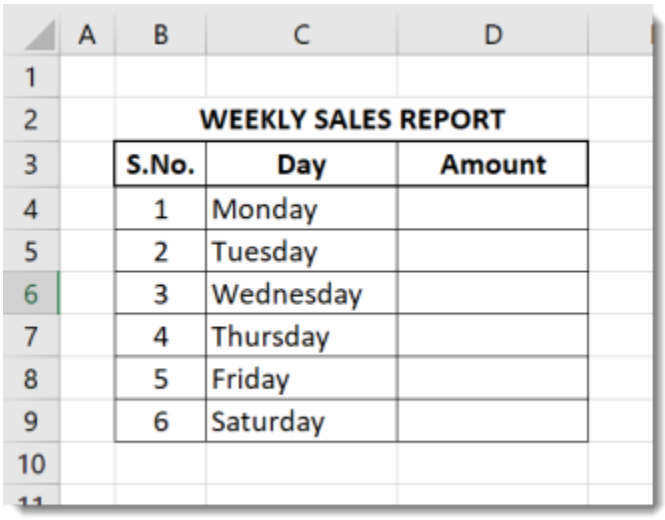
- **Personal Macro Workbook**

It allows you to combine all your frequently used macros into a single location, making it convenient to access them from multiple workbooks.

1. Enter a description of the macro and then click on the "**OK**" button to start recording the macro.

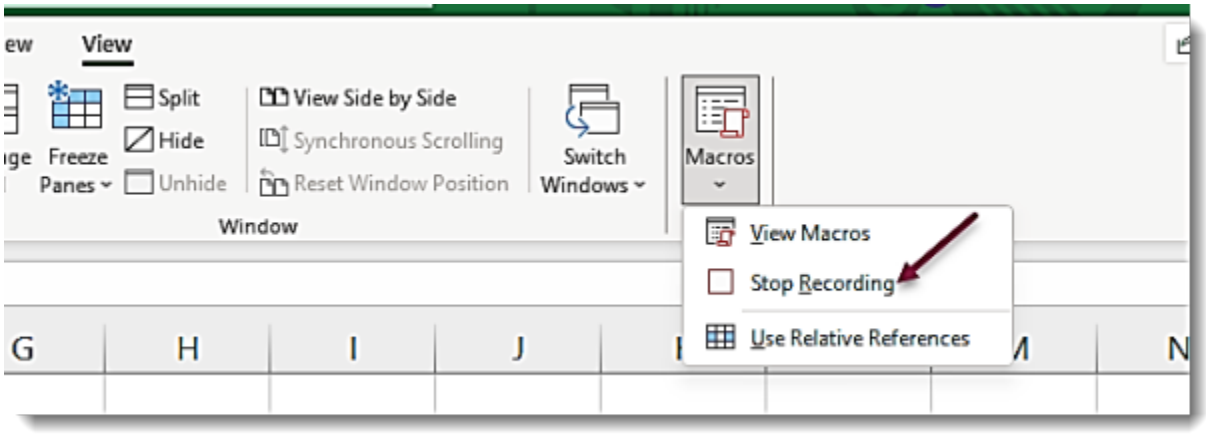


1. Start creating the table you want the Excel macro to automate. This includes formatting the cells and inserting your formulas where necessary. You can also refer to data in another worksheet or make copies.



	A	B	C	D
1				
2		WEEKLY SALES REPORT		
3		S.No.	Day	Amount
4		1	Monday	
5		2	Tuesday	
6		3	Wednesday	
7		4	Thursday	
8		5	Friday	
9		6	Saturday	
10				

1. When done, go to the **View** tab in the ribbon and click the **Macro** drop-down arrow. Next, click on the "**Stop Recording**" option.



Alternatively, press the shortcut keys "**Ctrl** + **Shift** + **Esc**" on your keyboard to stop the recording.

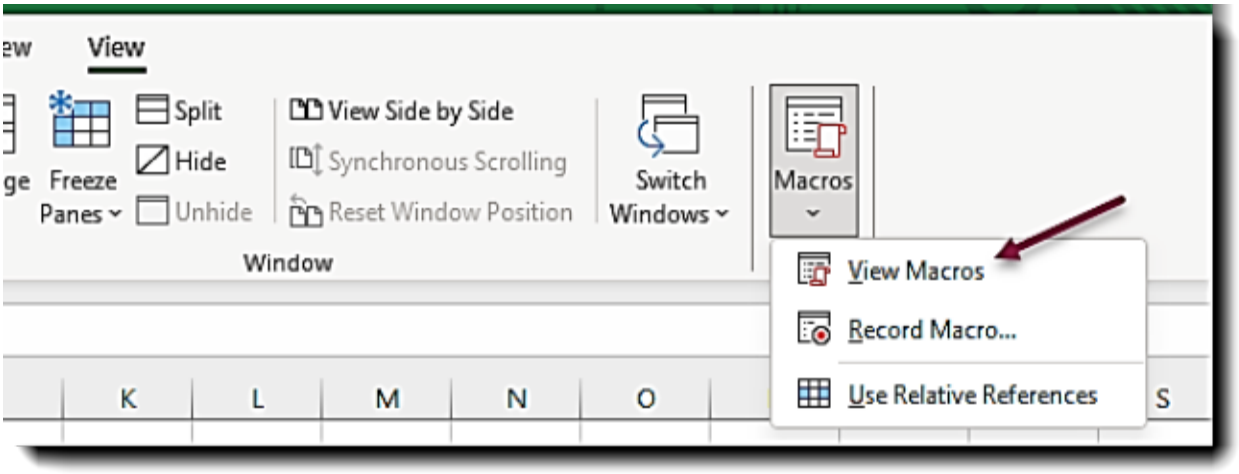
1. **Save** your worksheet

Remember, when creating a Macro, click the suitable cell at the beginning and click outside the task at the end. This will also help the macro to know where to start and end.

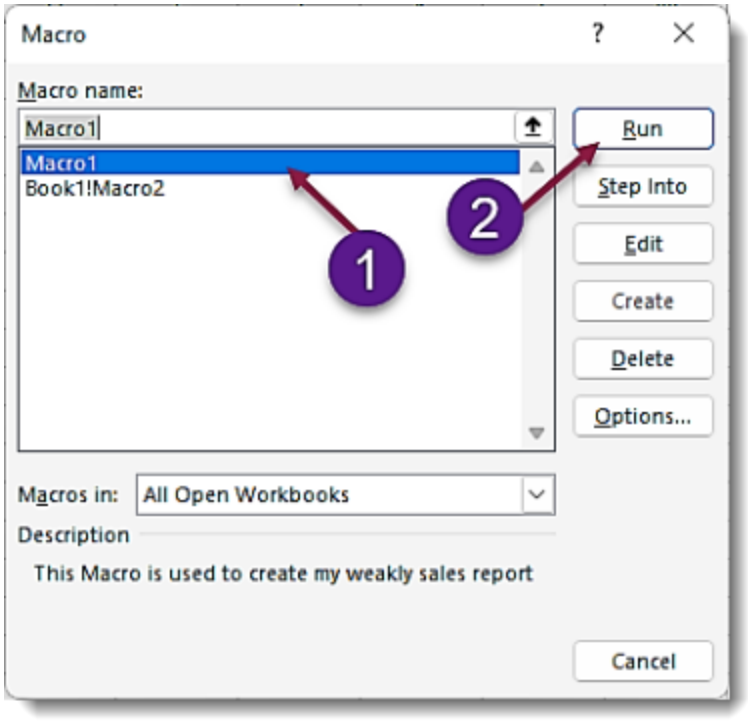
RUNNING YOUR FIRST MACRO IN EXCEL

Your macro is now set and ready to be used by following the steps below:

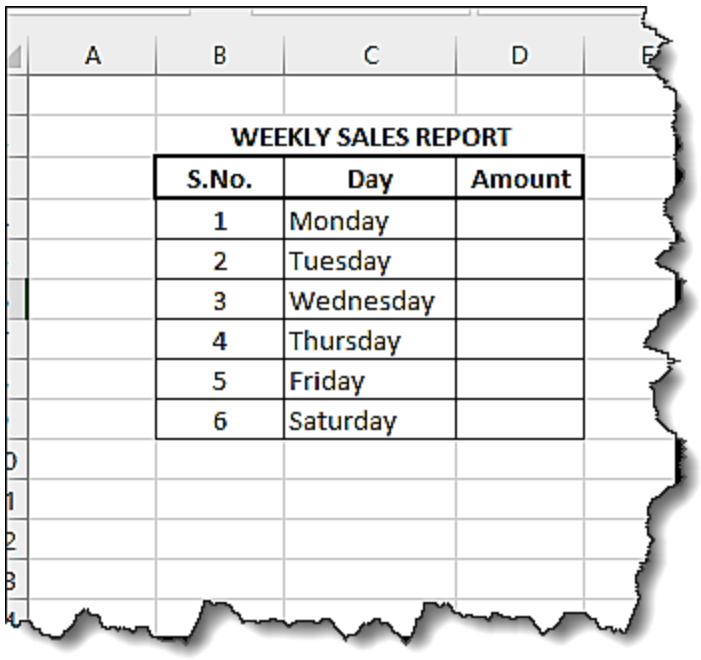
1. Go to the **View** tab
2. Click on the **Macros** drop-down arrow and select **View Macros**.



1. From the **Macro** dialog box, select the macro name you want to run, check the description to be sure and then click the **OK** button.



Excel will create an exact copy of the table in a second.



	A	B	C	D	E
		WEEKLY SALES REPORT			
		S.No.	Day	Amount	
		1	Monday		
		2	Tuesday		
		3	Wednesday		
		4	Thursday		
		5	Friday		
		6	Saturday		

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