



Excel 2016 Lecture Notes

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What is Excel?

Microsoft Excel is **spreadsheet** software that provides an interface for storing, organizing, analyzing and working with any type of information like text, numbers, and date. It can be used in business to deal with expenses, revenues, budgets, and charts.

The Excel file is often referred to as a **workbook** and each page in the workbook is a **worksheet**. **Worksheet** is a table which is a collection of **cells** organized into rows and columns.

Cells are really where you enter any information; you can enter text, a date, number, or formula.

Excel is a useful tool for business, scientific and statistical analysis. It can be used to:

- ✓ Manage and organize data.
- ✓ Analyze data.
- ✓ Sort Data.
- ✓ Apply Filters to data.
- ✓ Create visual representation of data using Charts.

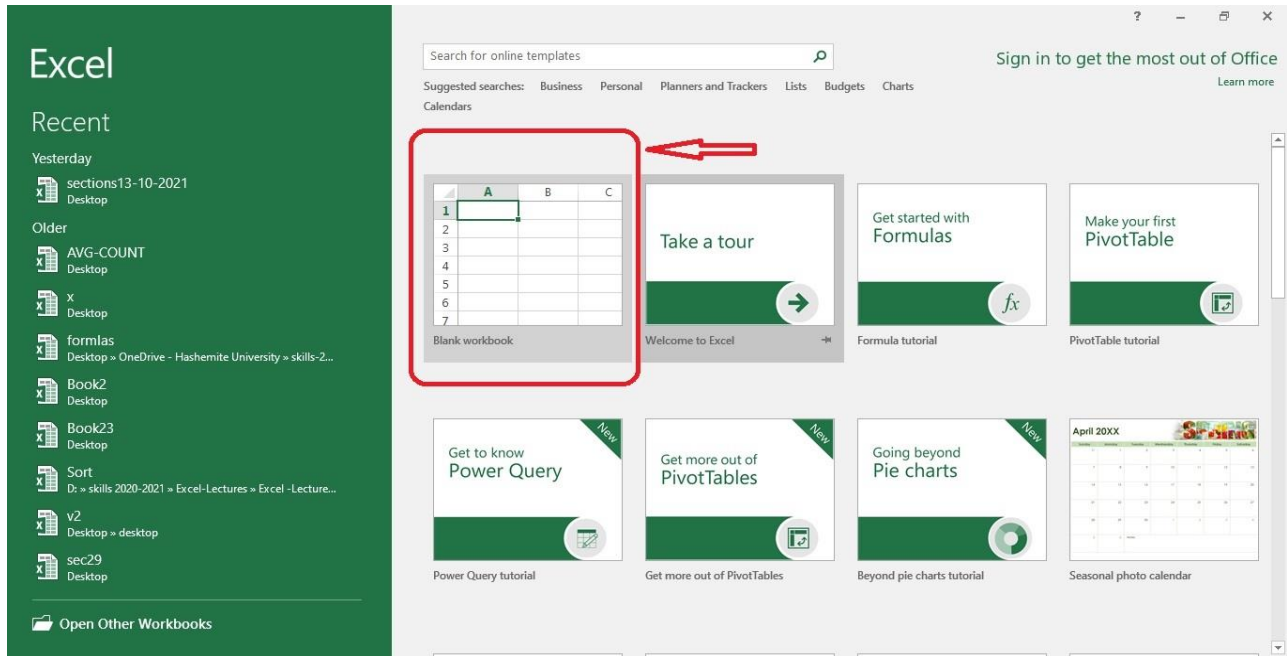
Starting Microsoft Excel 2016

By default, a new workbook has the name **Book1** with one worksheet named **Sheet1**. In Sheet1 the active cell is **A1**.

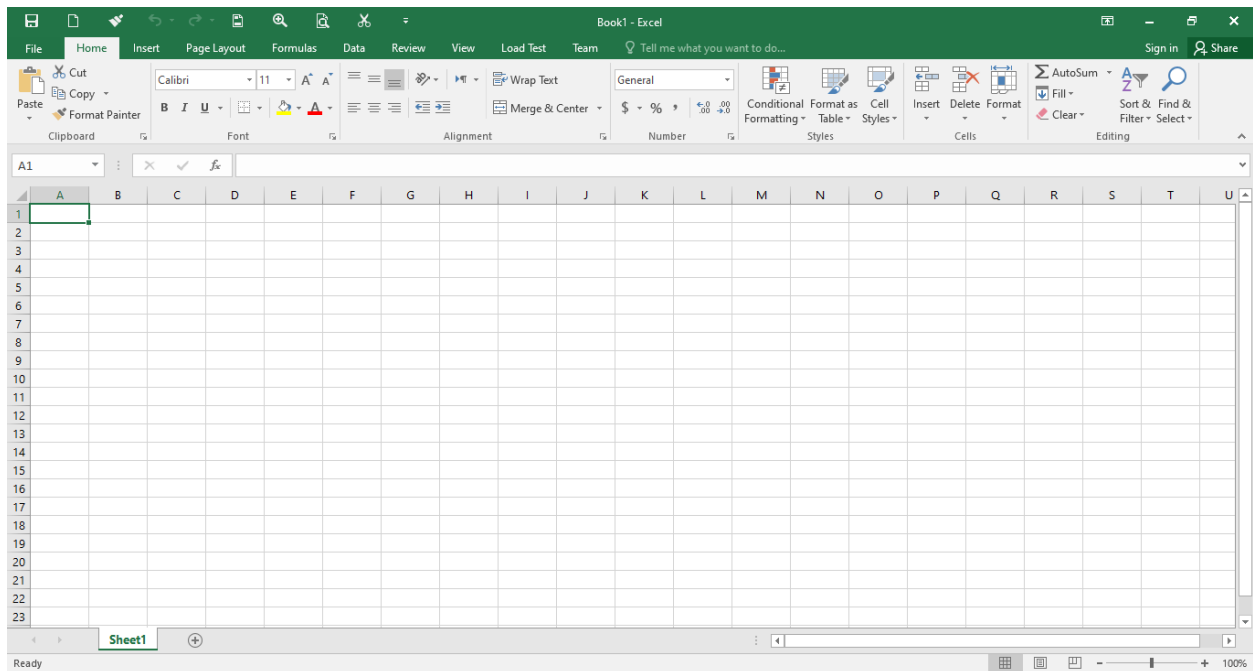
Excel file Extension is .xlsx

Excel interface

When you open Excel 2016 the window below will appear.



Select Blank workbook to create a new workbook.



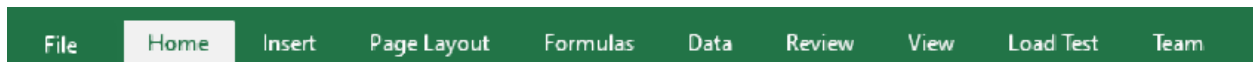
Title Bar: Title bar shows the workbook name which is by default Book1 before saving.



Quick Access Toolbar: It is part of Title bar it provides the most frequently used commands. You can customize the **Quick Access Toolbar** using **drop-down arrow** to the right.

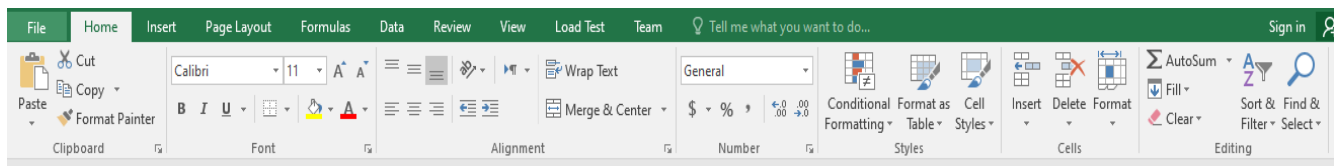


Tabs: They appear across the top of the Ribbon and contain groups of related commands. Home, Insert, Page Layout are example of ribbon tabs.



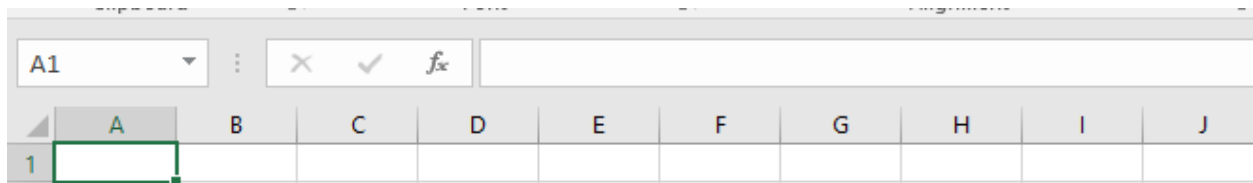
→The **File** tab used to do file-related operations, like open, save, create new workbook, or close.

Ribbons: contains commands organized in Groups for each tab



Name Box: contains the address of the active cell or the name of range.
Formula Bar: contains the content of the active cell.

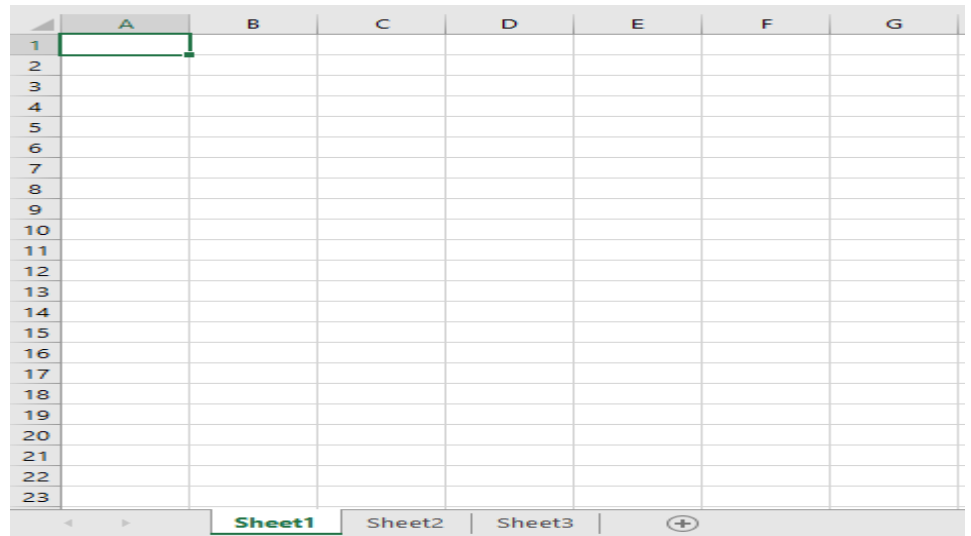
Active Cell: The cell where you enter any information surrounded by a rectangular box.



Column bar: Columns are numbered as A, B, C etc. After Z, it will start series of AA, AB and so on.

Row Bar: Rows are numbered as 1, 2, 3 etc.

Worksheets: Table which is a collection of [cells](#) organized into rows and columns. The active worksheet is bolded.

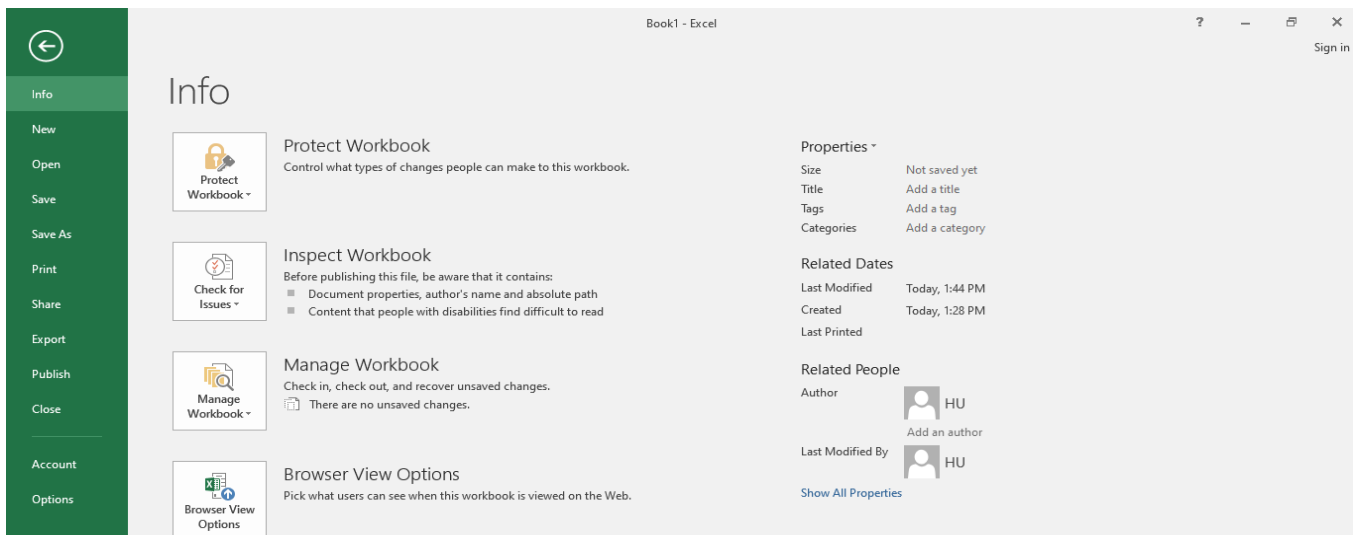
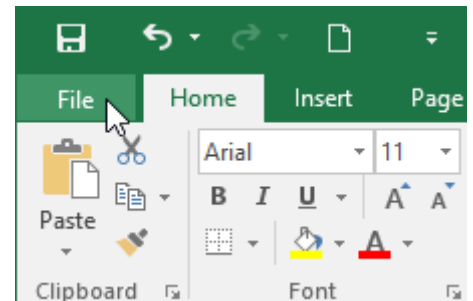


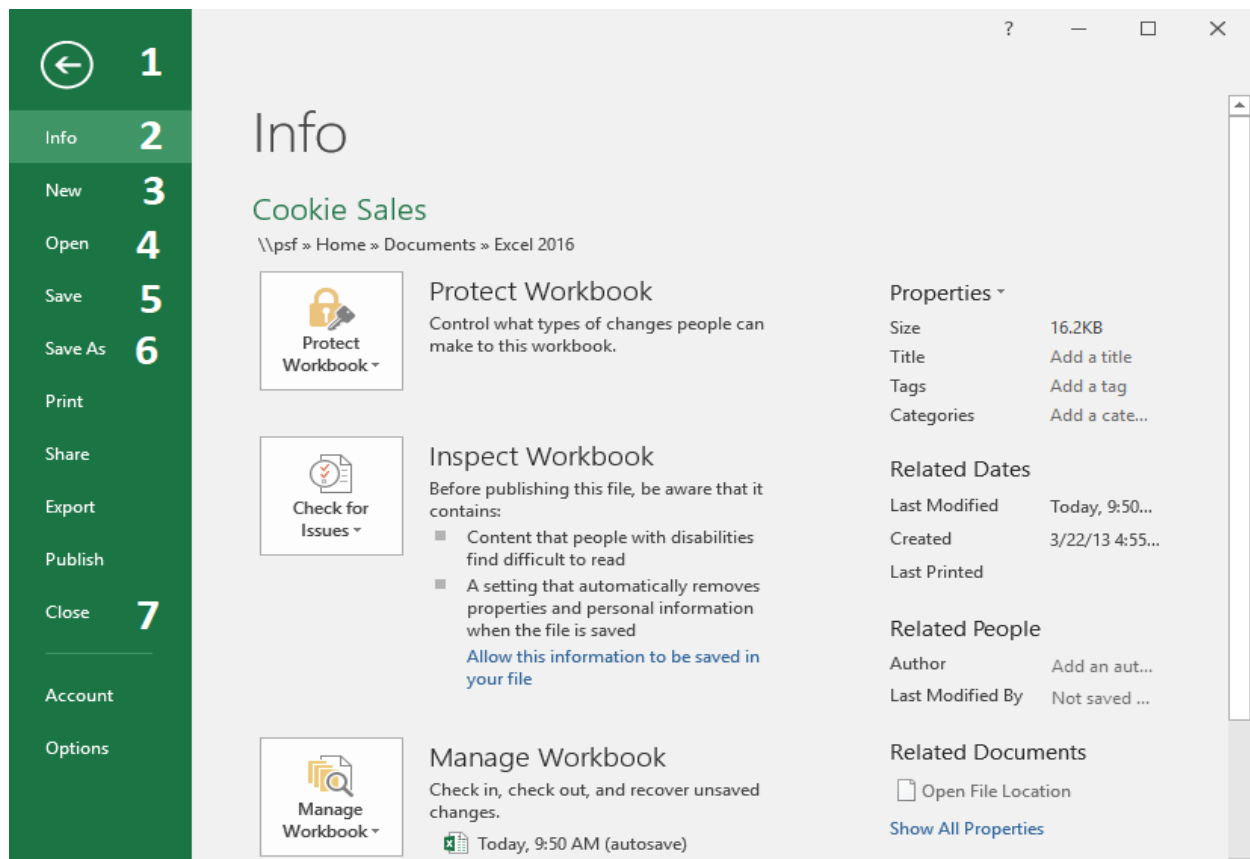
Zoom Controls: You can slide left or right to zoom in or out.



Backstage view

Backstage view will appear when you click on the **File** tab on the **Ribbon**.



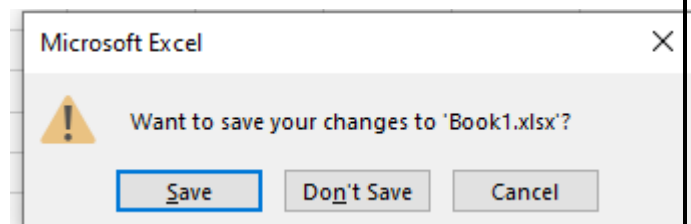


The numbers in the screenshot

- 1- Click on the **arrow** to close Backstage view and return to Excel.
- 2- **Info:** contains information about the current workbook.
- 3- **New:** creates a new blank workbook.
- 4- **Open:** opens recent workbooks, as well as workbooks saved to your **OneDrive** or on your **computer**.
- 5- **Save:** saves the changes on the file that has already been saved.
- 6- **Save As:** Select the **location**, enter a **file name** for the workbook, and click **Save**. Use Save As to create a copy from original workbook using another name, different file type, and different location.
- 7- **Close:** close the current workbook.

Note that if you try to close a workbook and you haven't saved your latest changes, Excel displays an alert message.

- Click on **Save** to save your changes before closing.
- Click on **Don't Save** to close the workbook and discard these changes.



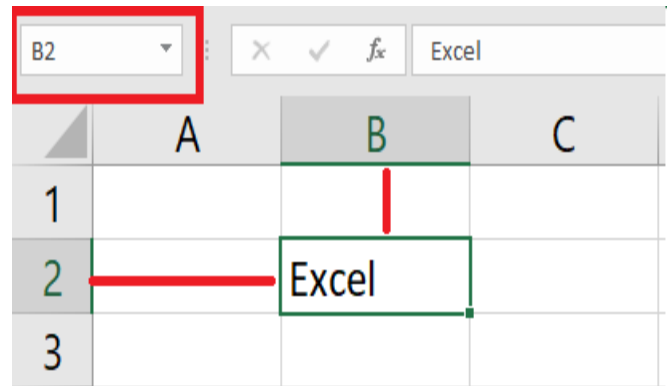
Cell references (addresses)

Each cell has a **cell address** or **reference**, based on the column and row where it is located, for example cell **B2** located in the column **B** and row 2.

Examples:

- A123, S10, AB1, AA100, BC78

→ **Remember:** Active cell reference appears in the Name Box.



Cell range

Cell range is a group of selected cells. Referring to a cell range, use the reference of the **first** and the **last** cells in the range, separated by a **colon (:)**.

Example 1:

Cell range **A1:A5** include the cells A1, A2, A3, A4, and A5.

Cell range **A1:C3** include the cells A1, B1, C1, A2, B2, C2, A3, B3, and C3.

Cell range **B1:F1** include the cells B1, C1, D1, E1, and F1.

Example 2:

How many cells in the range **B1:F1**?

Answer: 5 cells.

How many cells in the range **A1:C3**?

Answer: 9 cells.

Data Types in Excel

Excel allows you to enter different types of data into the cells, such as dates, text, formulas, time and numbers.

1- Text: is a combination of alphabetic letters, numbers, and symbols.

Examples:

First Mark name1 12+9 name??

12,3 30/2/2020 1 0 5 1*2

	A	B
1	Skills	30/2/2021
2	Course 1	1 0 9
3	12,3	5+6

- ✓ By default, Text appear on the **left** of cell.
- ✓ Typing any spaces within a number, it will be regarded as text.

2- Numbers

- ✓ They can be integers or real, negative or positive.
- ✓ By default, numbers appear on the **right** of cell. They can be formatted in different ways.
- ✓ **Dates and Times** are stored as numbers in Excel.
 - The date **1/1/1900** is represented by a serial number **1**.


	A
1	12
2	-8.5
3	10:33 AM
4	10/14/2020
5	0.258
6	57%

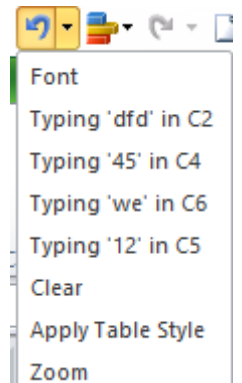
3- Formulas



- Formula must start with an "=" sign.
- It consists of relational or arithmetic operations (or special function) combined with numbers and/or cell references.

Using Undo & Redo command

To reverse the last changes, you make in a worksheet:

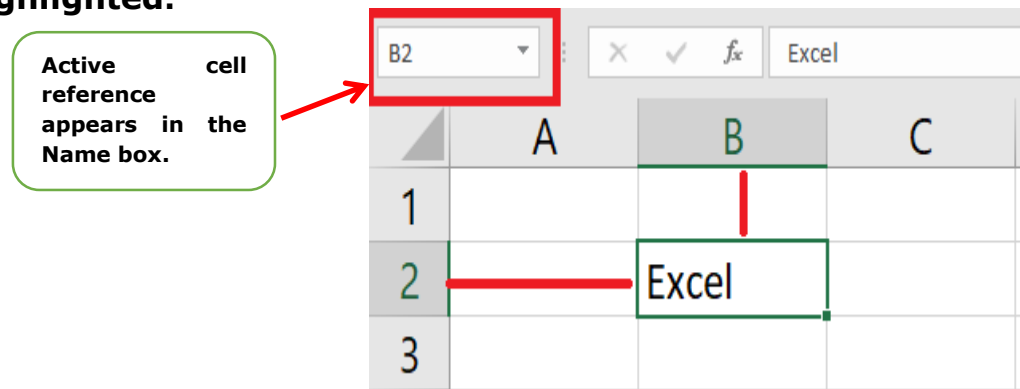
1. Click the Undo icon  on the Quick Access toolbar or press **Ctrl+Z** from keyboard.
2. To undo more than one action, click on the arrow next to undo icon to select the actions that you want to undo.




Note: You can use Undo  and Redo  (or **Ctrl+Y**) to switch back and forth between the actions in the worksheet.

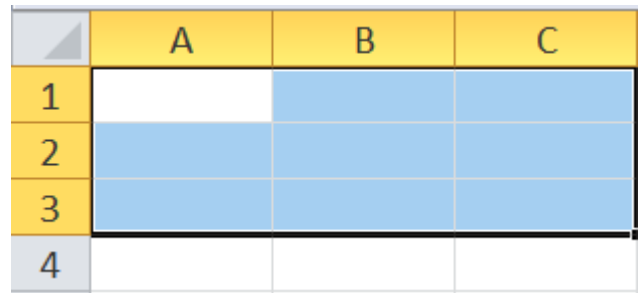
Dealing with Excel cells

Cell is where you really enter your data, the active cell reference appears in the Name box. Note that when the cell is selected the cell's **column** and **row headings** are **highlighted**.



Select a cell

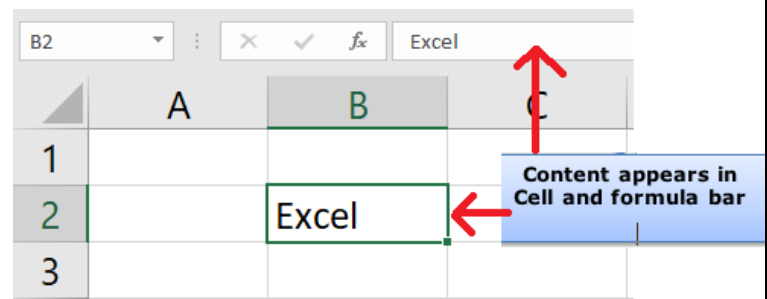
1. One Cell: Click a **cell** to select. A **border**  will appear around the selected cell
2. Cell range: Drag the mouse until all of the **cells** you want to select are **highlighted**. **The address of the first cell in the range appear in name box.**



	A	B	C
1			
2			
3			
4			

Cell content:

1. Insert content: Type **content** into the selected cell, then press **Enter** from keyboard. The content will appear in the **cell** and the **formula bar**.
2. Edit content: You can edit cell content by double click on the cell or from the formula bar.
3. Delete content: Press the **Delete** or **Backspace** key from keyboard.

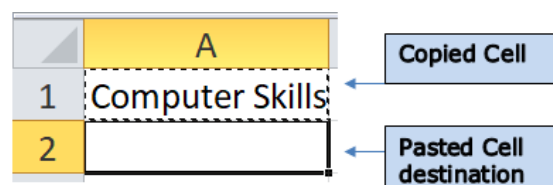
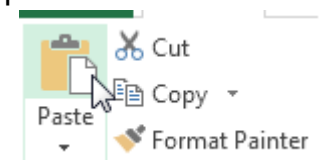
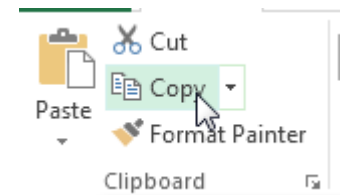


Note: to delete content

from **multiple cells** at once use **Delete** key while **Backspace** key will only delete the first cell content.

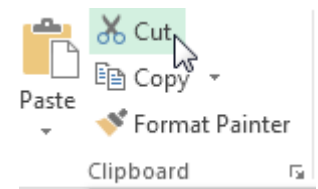
Copy & Paste cell content: *duplicates* cell content

1. Select the **cell(s)** you want to **copy**.
2. On the **Home** tab, click the **Copy** command on the **Clipboard** group, or press **Ctrl+C** from keyboard. Note that the copied cells will surrounded by **dashed box**.
3. Select the **cell(s)** where you want to **paste**. On the **Home** tab, click the **Paste** command on the **Clipboard** group, or press **Ctrl+V** from keyboard.
4. The content will be **pasted** into the selected cells.



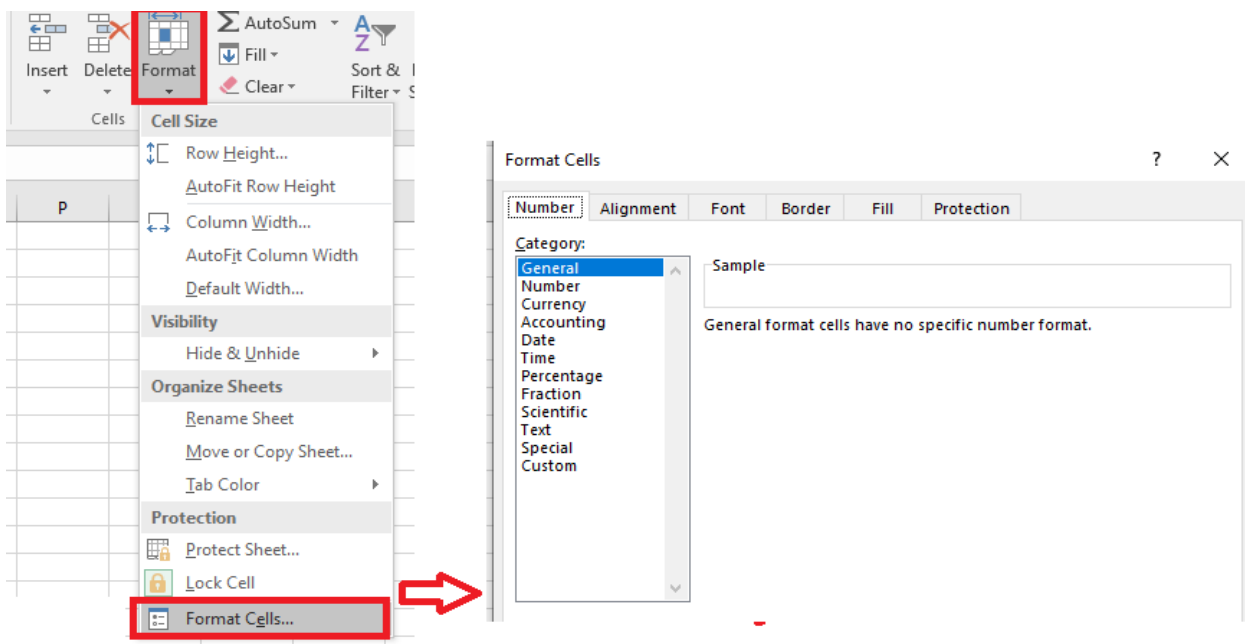
Cut & Paste cell content: *moving* cell content

1. Select the **cell(s)** you want to **cut**.
2. On the **Home** tab, click the **Cut** command on the **Clipboard** group, or press **Ctrl+X** from keyboard. The cut cells will have a **dashed box**.
3. Select the cells where you want to **paste** the content.
4. Click the **Paste** command on the **Home** tab, or press **Ctrl+V** on your keyboard.
5. The cut content will be **moved** from the original cells and **pasted** into the selected cells.

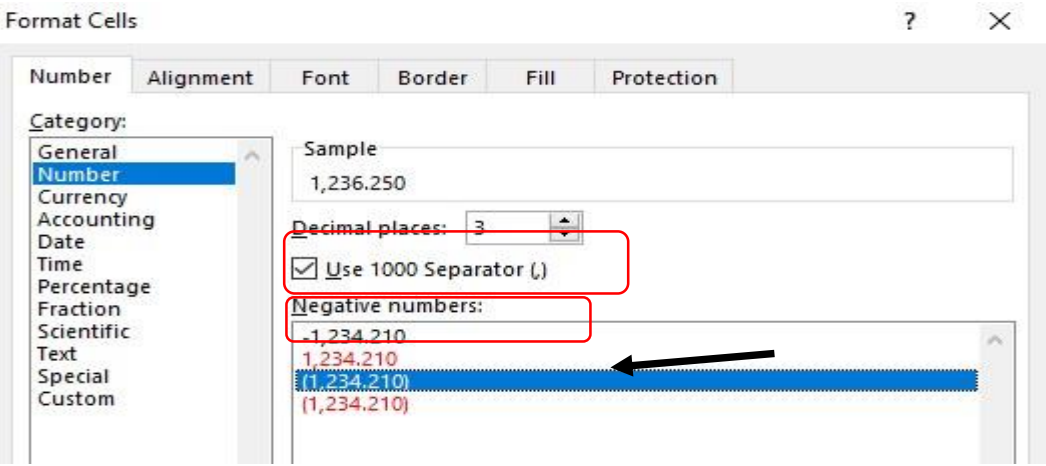
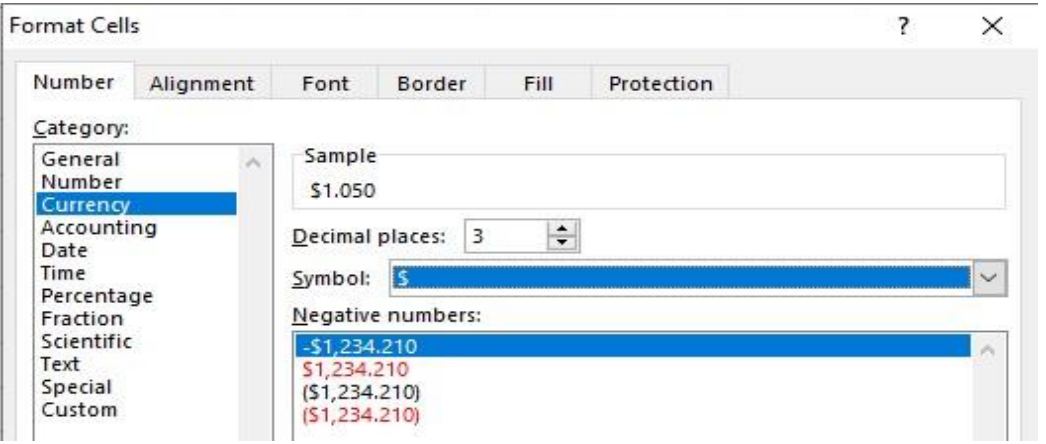
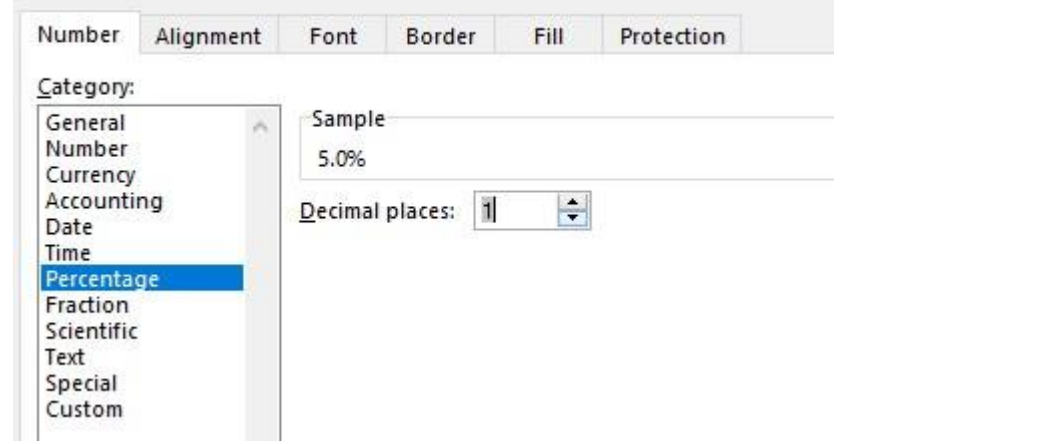


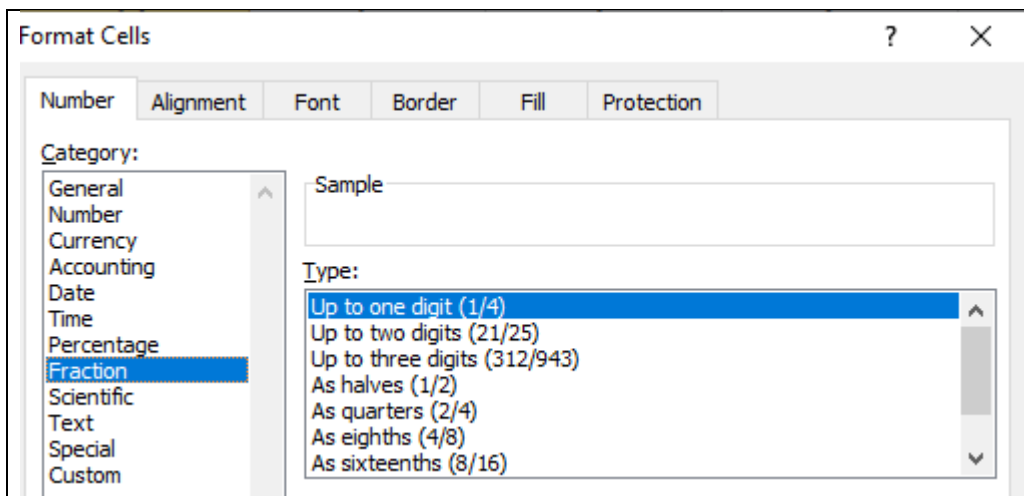
Format Cell content

- Select the cells that you want to format.
- Click the **Format** command in the **Cells** group on the **Home** tab.
- Select "**Format Cells**" from the menu. Or Right-click on the selected cells, from the menu select "**Format Cells**".
- The Format Cells Dialog Box will appear. Choose the suitable tab to format the cell content.

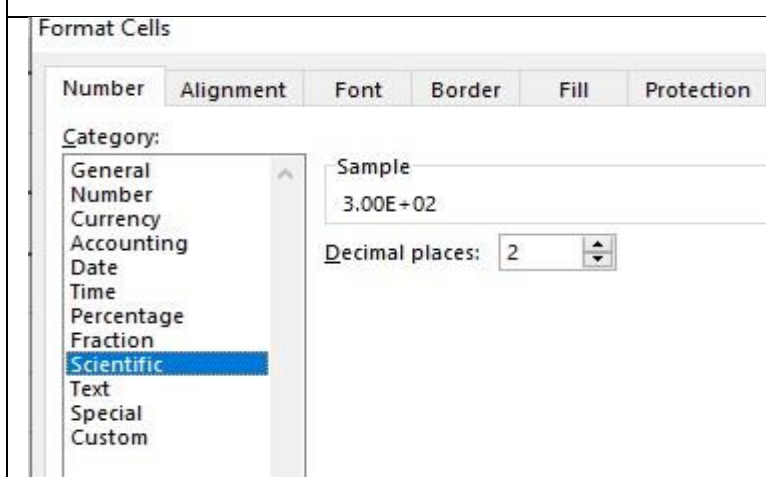


1- Number tab:

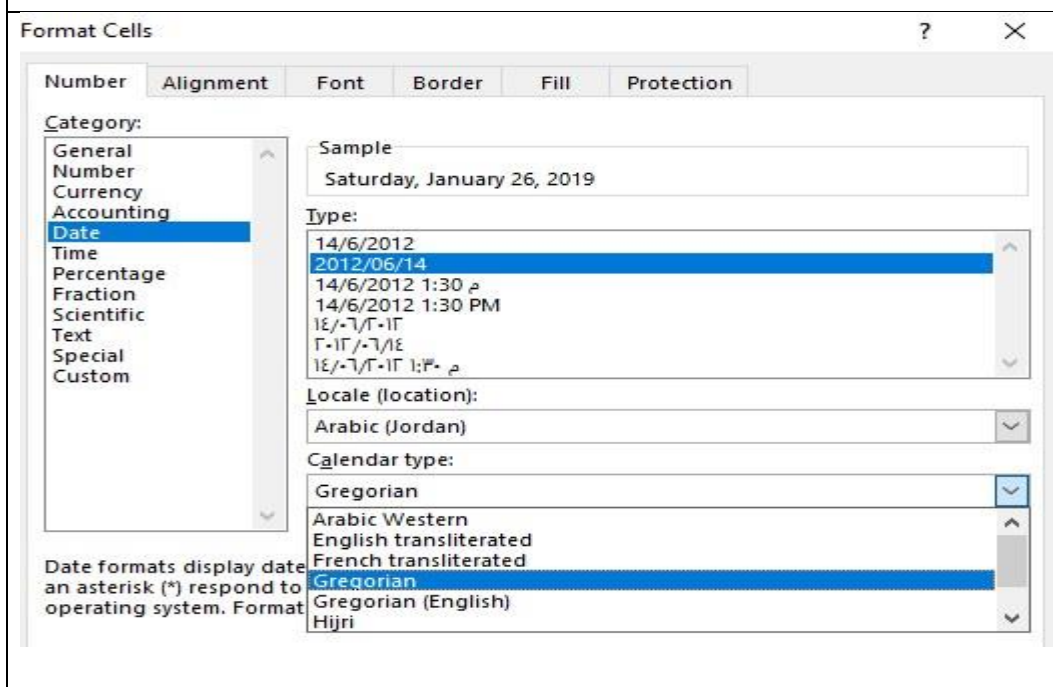
	<p>1236.25 Will be 1,236.250</p>
	<p>1.05 Will be \$1.050</p>
	<p>0.05 Will be 5.0%</p>

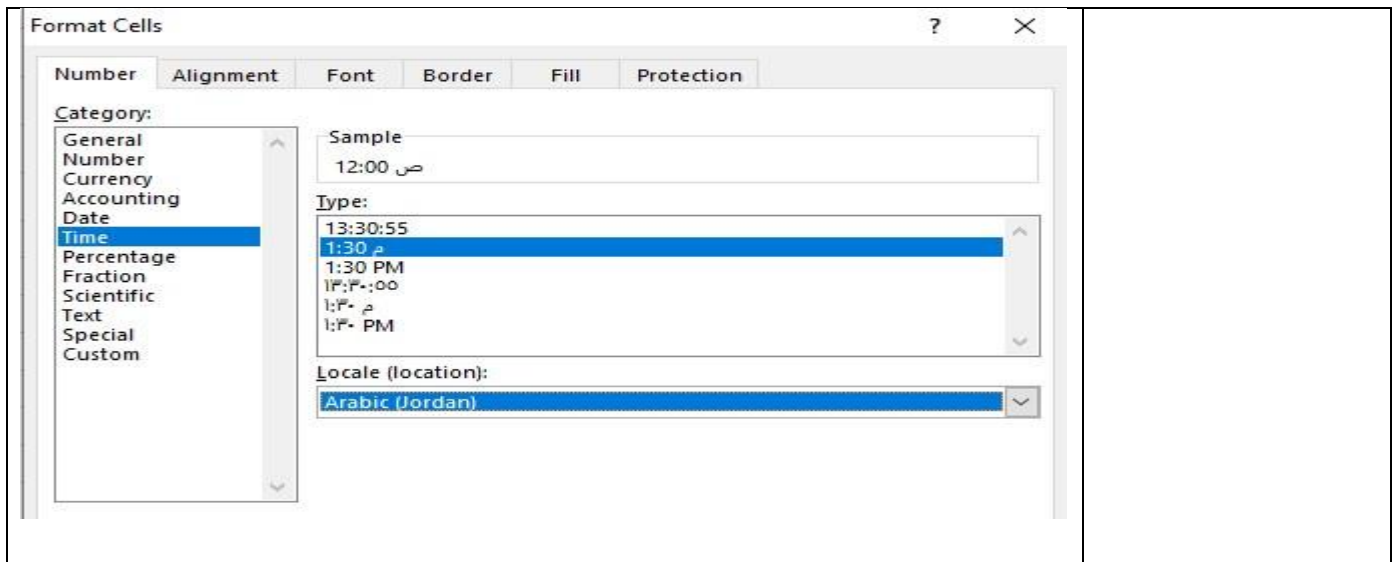


1.5
Will be
1 1/2



300
Will be
3.00E+ 02





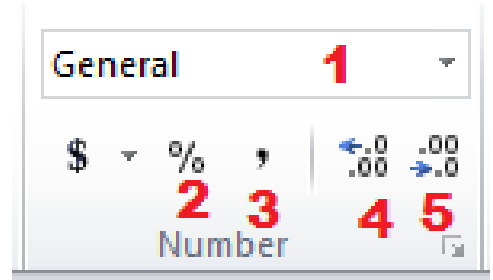
Number formats Summary

Format	Description
General	Numbers are displayed just the way you type them.
Number	You can: <ol style="list-style-type: none"> 1. Determine the number of decimal places 2. Use thousands separator. 3. Determine how to display negative numbers.
Currency	Used for monetary values. You can: <ol style="list-style-type: none"> 1. Determine the number of decimal places. 2. Choose the currency symbols. 3. Determine how to display negative numbers.
Date	Displays date according to the <u>type, location and Calendar</u> that you specify.
Time	Displays time according to the <u>type and location</u> that you specify.
Percentage	Displays the percent (%) symbol and multiplies the cell value by 100. You can determine the number of decimal places.
Fraction	Displays a number as a fraction. You can determine the type of fraction that you want.
Scientific	Displays a number in exponential notation. You can determine the number of decimal places.

Note: if you want to know the serial number for any date you can change the cell format to number, and vice versa.

Number group icons on Home Tab:

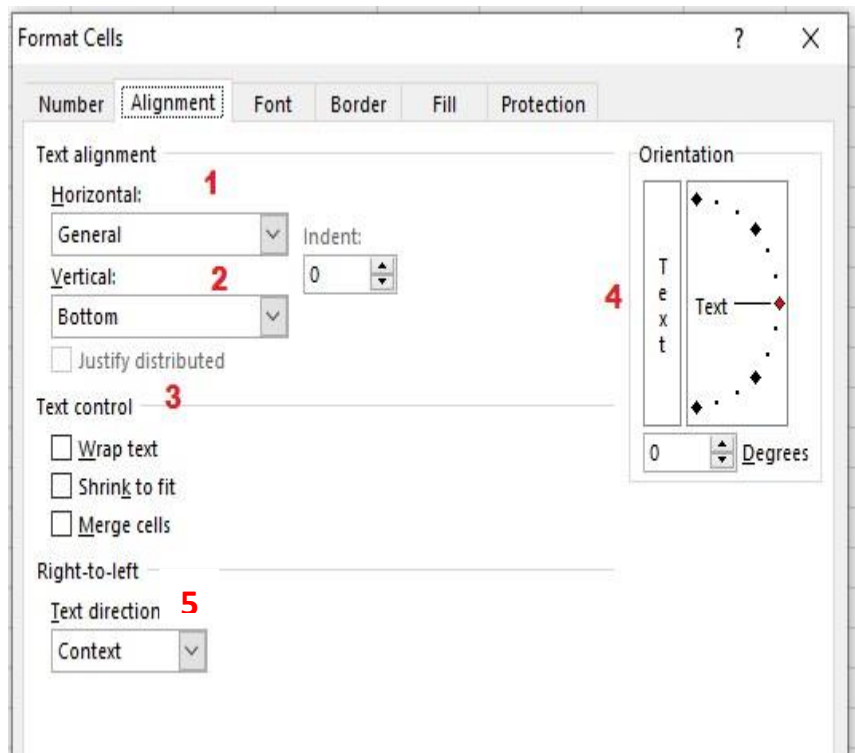
- 1-** Choose number format from the list (**General, Number, Currency, Short Date, Long Date** etc.).
- 2-** **Percent Style** formats.
- 3-** **Thousands Comma Style**.
- 4-** **Increase Decimal** places.
- 5-** **Decrease Decimal** places.



2- Alignment tab:

- 1.** Horizontal alignment: [Left, Center, Right]
- 2.** Vertical alignment: [Top, Center, Bottom]
- 3.** Text control:

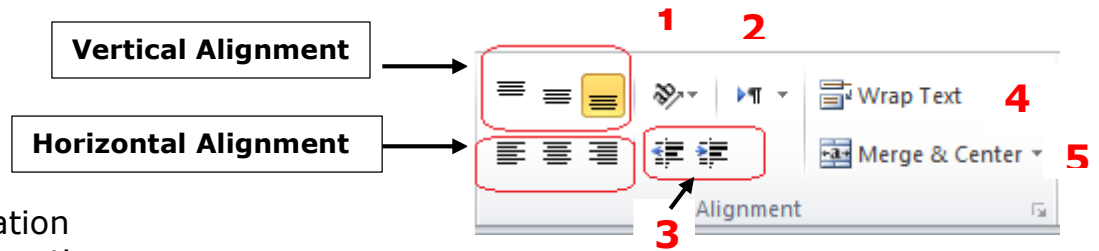
- Shrink to fit: will automatically reduce the font size in a cell so that the cell content fits without wrapping.
- Wrap text: cell content will appear on multiple lines without changing the column width.
- Merge Cells: Merge two or more adjacent cells, the merged cells become one cell across multiple rows and columns.



- 4.** Orientation: rotate the text diagonally or vertically. It is a useful way to label narrow columns. You can rotate the text up, down, clockwise, or counterclockwise, or align text vertically.
- 5.** Specify Text direction:
 - Left – to – Right.
 - Right – to – Left.
 -

	A	B	C
1	March	April	May
2			

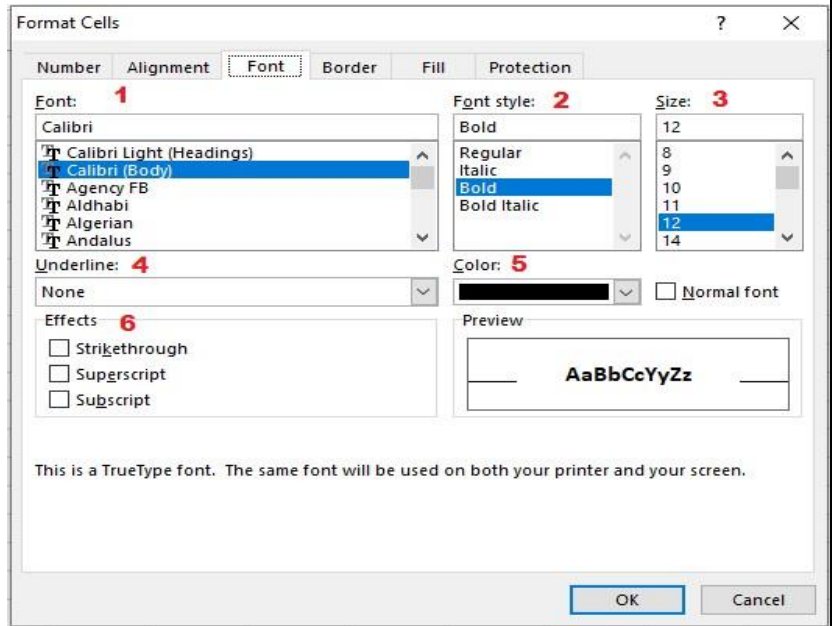
Alignment group icons on Home Tab:



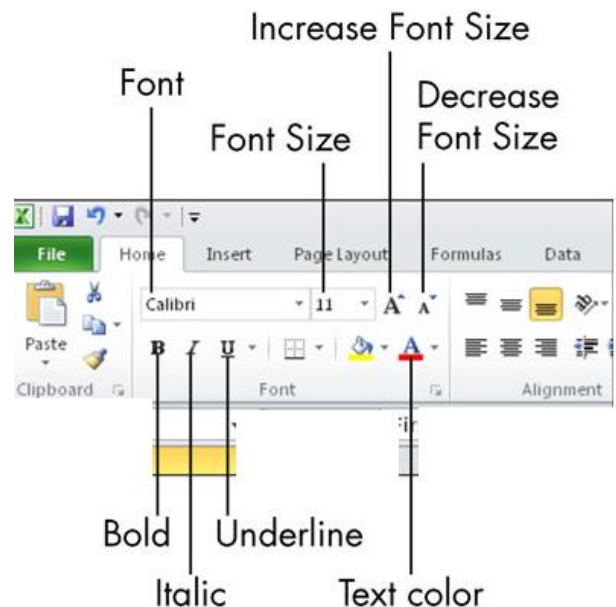
1. Orientation
2. Text direction
3. Indentation
4. Wrap Text
5. Merge and Unmerge Cells

3- Font tab

- 1- Font Type
 - 2- Font Style [*Italic*, **Bold**, *Bold Italic*]
 - 3- Font Size
 - 4- Underline: [None, Single, Double]
 - 5- Font color
 - 6- Font Effects:
 - **Strikethrough**: draw a line through the selected text or numbers.
 - **Superscript**: cell contents positioned slightly higher.
 - **Subscript**: cell contents positioned slightly lower.
- Use subscripts and superscripts for individual characters in a cell.



Font group icons on Home Tab:

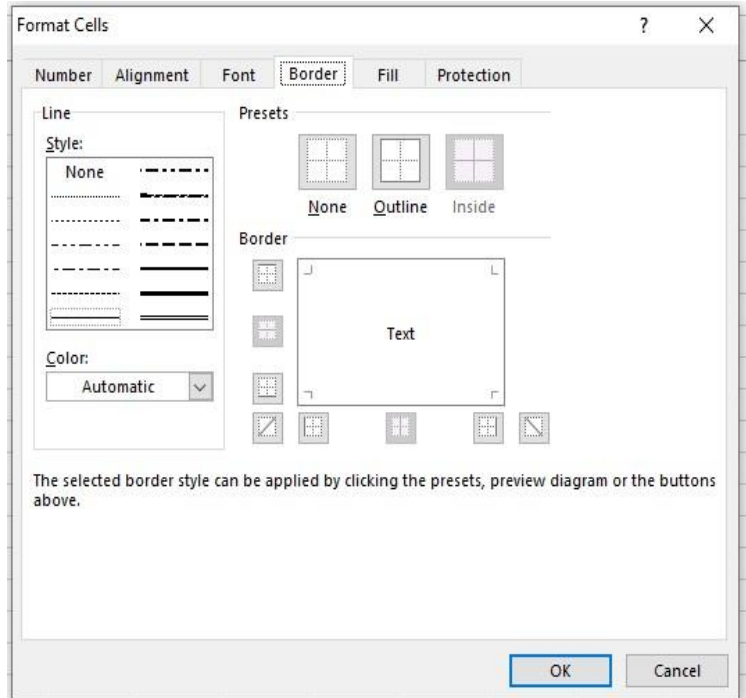


4- Border tab

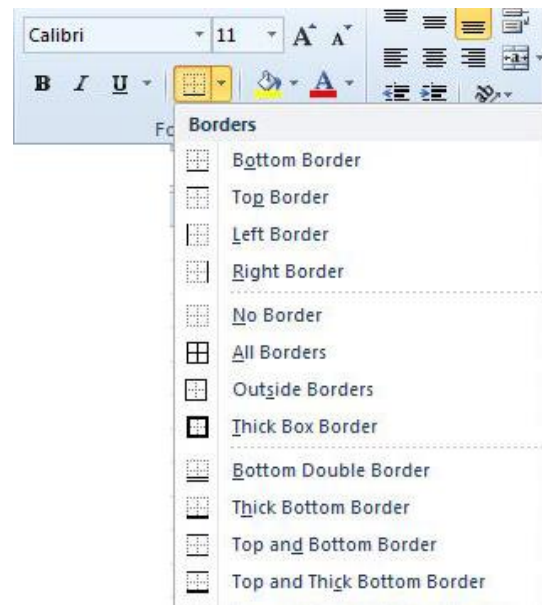
Excel offers different types of borders that you can add to individual cells or ranges of cells in your spreadsheet.

To add borders to selected cell(s):

1. Select the cell or range of cells that you want bordered.
2. Select a **line type** from the Style area.
3. Select a **line color** from the Color area.
4. In the Border section of the format cells dialog box, select where you want the border applied.
 - ✓ **None:** to remove borderlines.
 - ✓ **Outline:** borderlines will surround the entire cell or cell range.
 - ✓ **Inside:** borderlines will appear around all cell edges for each selected cell.

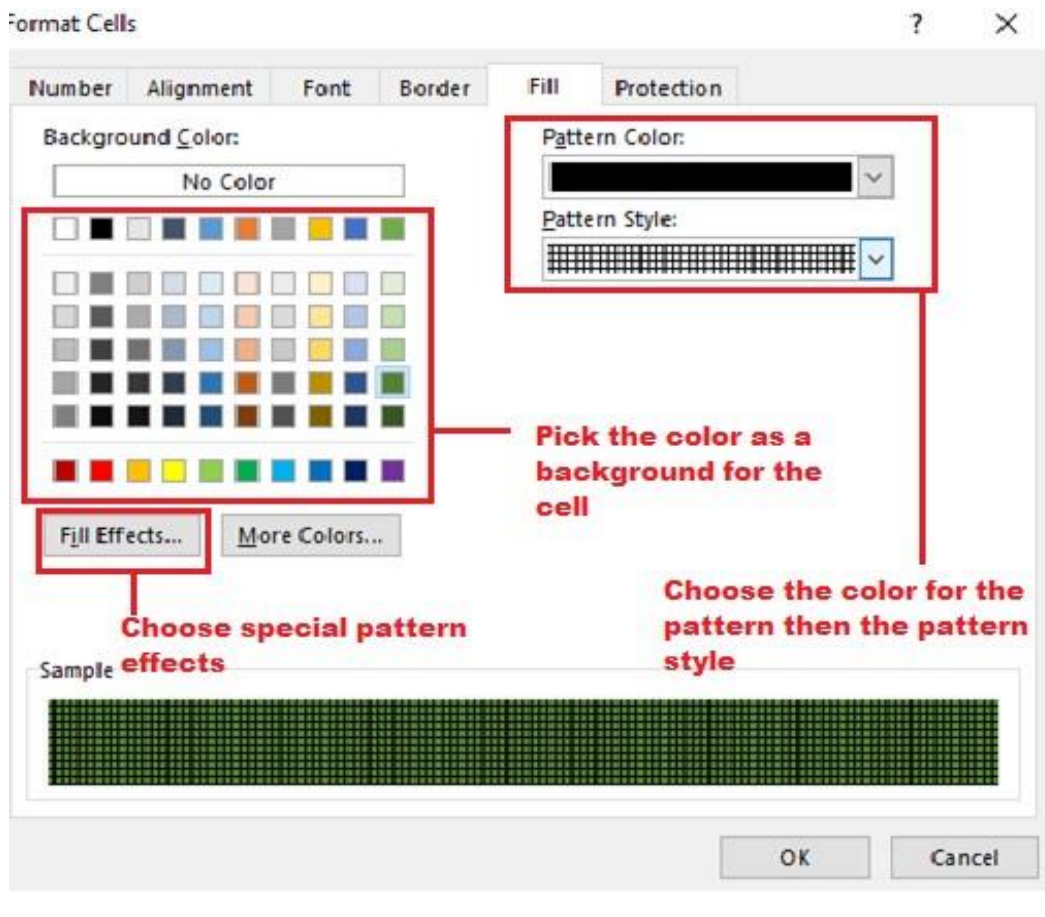


Border icon on Font group on Home Tab:

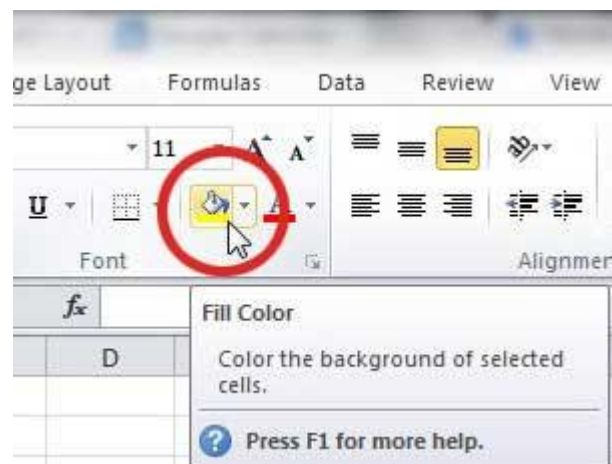


5- Fill tab:

Adding a background color or a pattern using fill effects

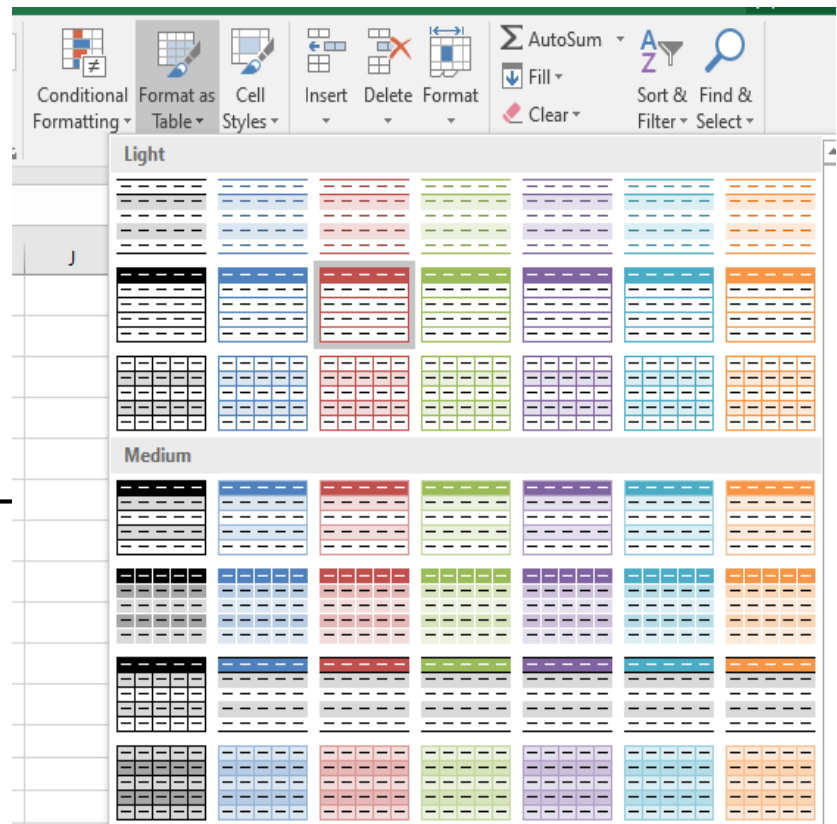


Fill color icon on Font group on Home Tab:



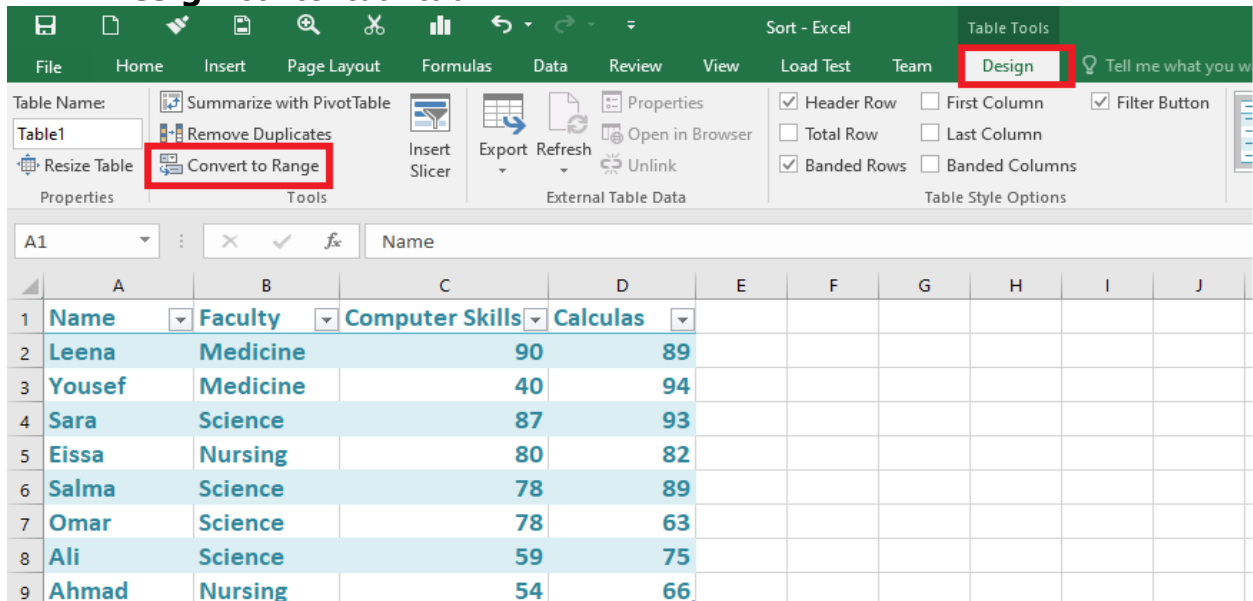
Format Cells as Table [i.e. using the predefined table's styles]

- Select the Cells.
- Click the **Format as Table** command in the **Styles** group on the **Home** tab, and choose the appropriate style.
- Select this check box [My table has headers] if your table has column headings.



→The table will have drop-down arrows in their headers; you can remove these arrows by:

- ✓ Click the **Convert to Range** command in the **Tools** group on the **Design** contextual tab.

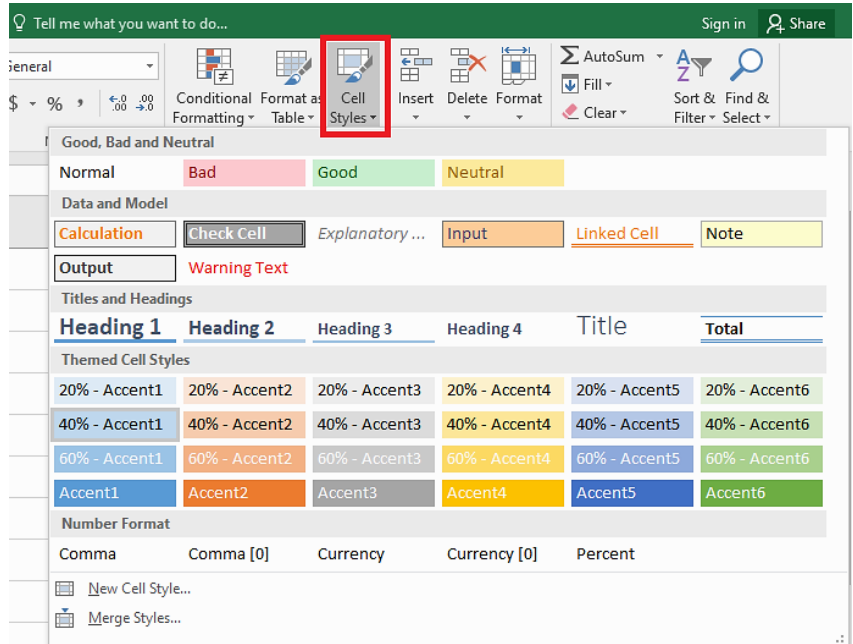


Note: the contextual tab Design appears only when you choose one of the styles.

Cell Styles

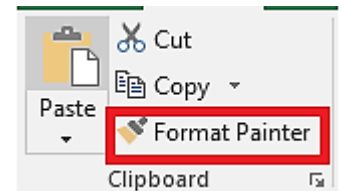
Cell style is a pre-defined set of formats, such as fonts, font sizes, number formats, borders, and shading.

1. Select the cell, then from **Home** tab, **Styles** group, and click on **Cell Styles**.
2. Choose the suitable style.

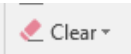


Copy Formats with Format Painter

1. Select the cell(s) that you want to copy their formats.
2. On the **Home** tab, click on the **Format Painter** icon on the **clipboard** group.
3. Select the cells where you want to apply the copied formats.



Using Clear command

1. Click the Clear button  , in the **Editing** group On the **Home** tab.
2. Choose one of the following:
 - ✓ Clear All: will clear all contents, formats, and comments in the selected cells.
 - ✓ Clear Formats: will clear only the formats in the selected cells.
 - ✓ Clear Contents: will clear only the contents and leaving the comments and any applied formats in the selected cells.
 - ✓ Clear Comments: will clear any comments in the selected cells if there is any.

Notes: If you select a cell or a group of cells and then press DELETE from the keyboard, this will clear the cell contents only and leaving the cell formats.

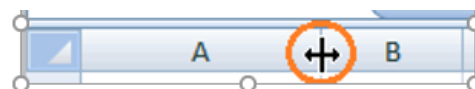
Dealing with Excel Columns & Rows:

Select column or row:

- To select a single column or row, click on the column heading [A, B,...] or row heading number [1, 2,] .
- To select adjacent (متتالية) columns or rows, click on the first column or row heading and drag to the last one. Or press **shift** key hold down while you select the last one.
- To select multiple columns or rows, click on the first column or row heading and then hold down **CTRL** while you select other headings.

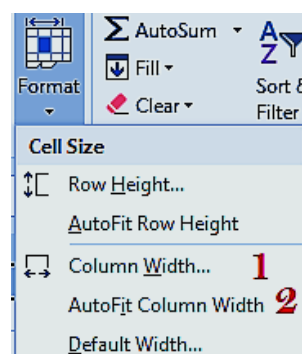
Modify column width:

Position the mouse cursor over the column line in the column heading, and then drag the cursor to the right to increase the column width or to the left to decrease the column width.



OR Click the **Format** command in the **Cells** group on the **Home** tab. Select

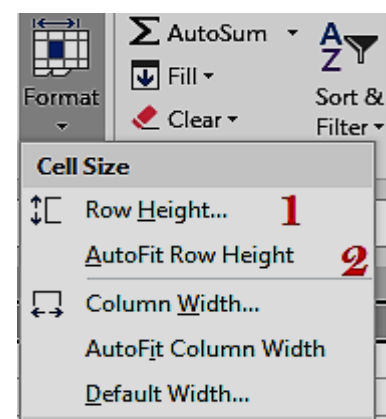
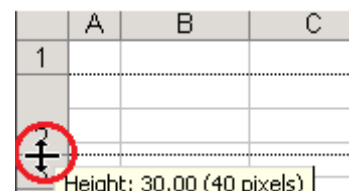
1. **Column Width...** to enter a specific column width.
2. Select **AutoFit Column Width** to adjust the column width according to the contents of that column so all of the content will fit.



NOTE: If you see ##### in a cell, it means that the column width is not wide enough to display the cell content. You have to **increase the column width** to display the cell content.

Modify row height:

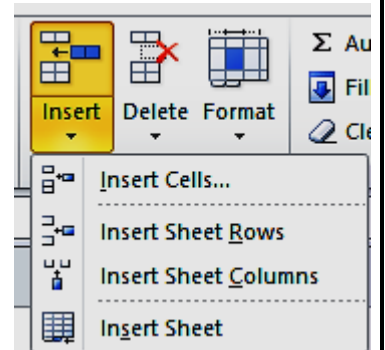
- Position the mouse cursor over the row line in the row heading, and then drag the cursor down to increase the row height or up to decrease the row height.**OR**
- Click the **Format** command in the **Cells** group on the **Home** tab. Select :
 1. **Row Height...** to enter a specific row height.
 2. **AutoFit Row Height** to adjust the row height according to the contents of that row so all of the content will fit.



Insert columns or Rows:

1- **Insert Columns:**

Select the column to the right of where you want the new column to appear. The new column always appears to the left of the selected column (i.e. **before** the selected column). On the **Home** tab, click the **Insert** command in the **Cells** group → Insert Sheet Columns.



2- **Insert rows:**

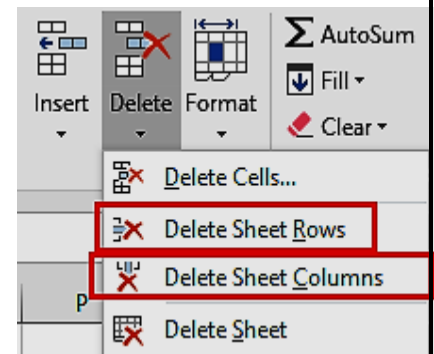
- Select the row to the bottom of where you want the new row to appear. The new row always appears **above** the selected row. On the **Home** tab, click the **Insert** command in the **Cells** group → Insert Sheet Rows.

Or: Right click on the column or Row where you want the new one to appear. Choose **Insert** form the list.

Delete columns or Rows:

- Select the column or row. On the **Home** tab, click the **Delete** command in the **Cells** group.

Or: Right click on the column, choose **Delete** form the list.

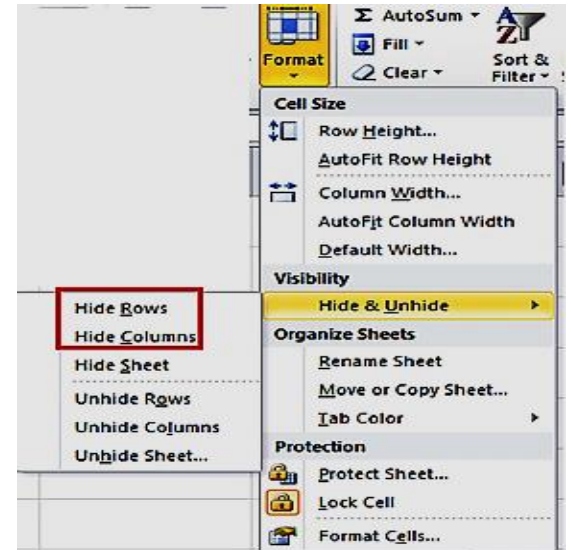
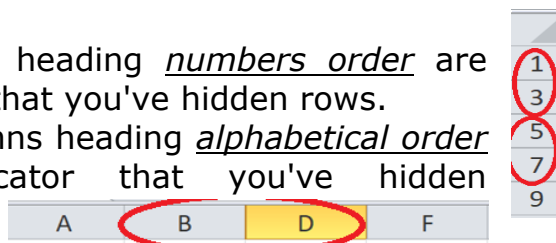


Hide rows or columns:

1. Select the rows or column headings that you want to hide.
2. Right-click the selected, and then select **Hide** or Click the **Format** button in the **Cells** group on the **Home** tab and click on **Hide & Unhide**.
3. Click on **Hide Rows** or **Hide Columns**.

NOTE:

- The rows heading numbers order are indicator that you've hidden rows.
- The columns heading alphabetical order are indicator that you've hidden columns.



Unhide (show) rows or columns:

1. Select the adjacent rows for the hidden rows. Right-click the selected rows, and then select **Unhide**

Or Click the **Format** button in the **Cells** group on the **Home** tab and click on **Hide & Unhide**. Click on **Unhide Rows** or **Unhide Columns**.

Dealing with Excel Worksheets

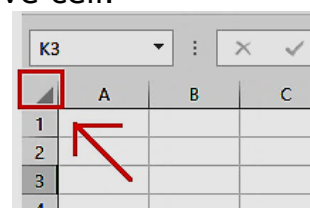
By default, a new workbook has one worksheet, you can select, rename, insert new worksheets, delete, hide, unhide [show], copy and move worksheets.

Navigating within a worksheet

- ✓ Using the mouse.
- ✓ Use the arrows keys from keyboard.
- ✓ **Enter** key will move to the cell that is below the active cell.
- ✓ **Tab** Key will move to the cell that is on the right of the active cell.

Selecting the entire worksheet

You can select the entire worksheet by clicking the square to the immediate left of the Column A and above the Row 1.

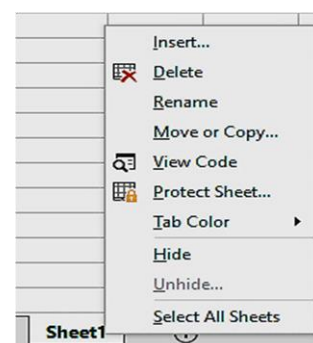


Renaming worksheets

1. On the **Home** tab, click the **Format** command in the **Cells** group.
2. Select **Rename Sheet**. Type a new name.

OR

1. Right-click on the **sheet tab**. Click on **Rename** from the menu. Type the new name.

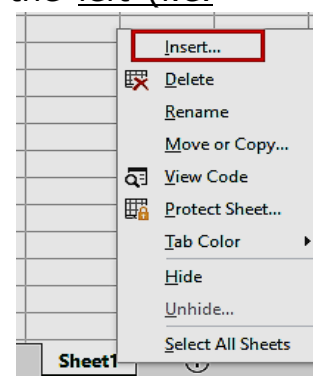


Insert a new worksheet:

1. Select the sheet to the right of where you want the new sheet to appear.
2. On the **Home** tab, click the **Insert** command in the **Cells** group.
3. Select **Insert Sheet**. The new sheet always appears to the left (i.e. before) of the selected sheet.

OR: Right-click on the sheet tab (the sheet to the right of where you want the new sheet to appear), Click on the **Insert** from the list.

OR: Click on the icon shown below, the new worksheet will be named Sheet4, Sheet5,



Delete Worksheet:

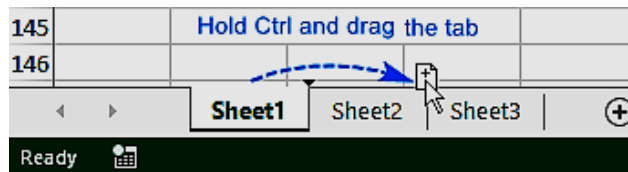
1. Select the sheet you want to delete.
2. On the **Home** tab, click the **Delete** command in the **Cells** group. From the menu, select **Delete Sheet**.

OR: Right-click on the sheet tab that you want to delete, and Click on the **Delete** from the list.

Copy Excel Sheet

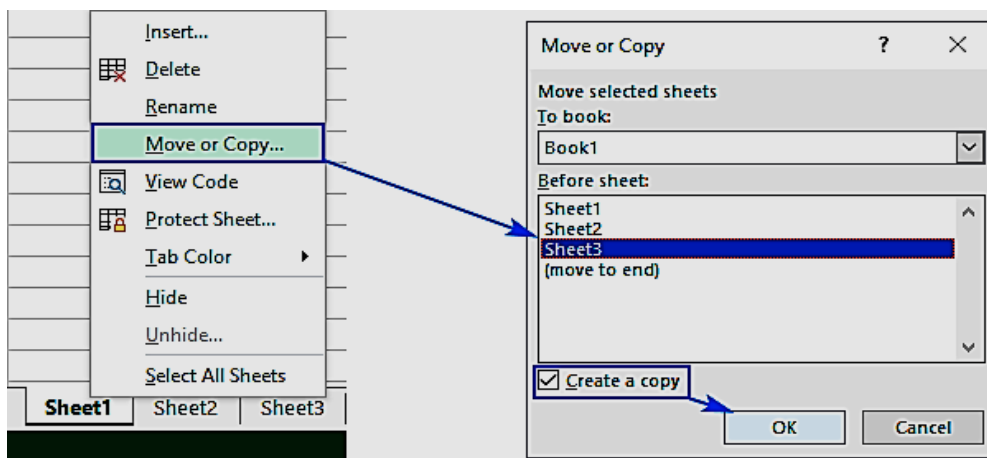
Method 1: Use drag and drop to Copy Excel sheet

- Click on the tab for the sheet that you want to copy, hold down the **Ctrl** key and drag the tab to the place you want.



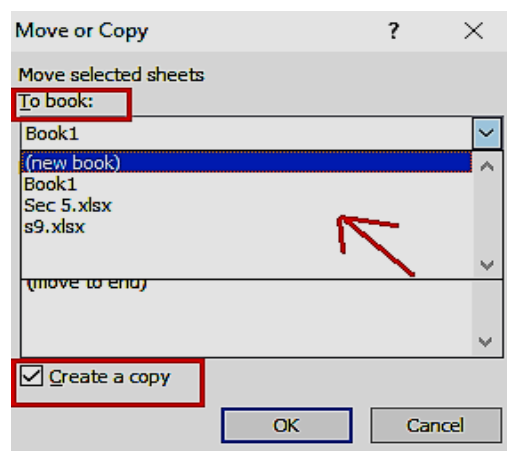
Method 2: Copy the sheet within the same workbook

1. On the **Home** tab, click the **Format** command in the **Cells** group and select **move or copy sheets** OR Right-click on the sheet tab and then click **Move or Copy** from the menu.
2. Excel will open the Move or Copy dialog box. In the **Before Sheet** list box, select location you want to drop the copy.
3. Check the **Create a Copy** check box.



Method 3: Copy the sheet to a another workbook

- o In the **To Book:** select the (**New Book**) option to copy to a new workbook.
- o In the **To Book:** drop-down list, select the workbook to which you want to copy worksheet. [**Note that the workbook that you want to copy on it should be opened**]

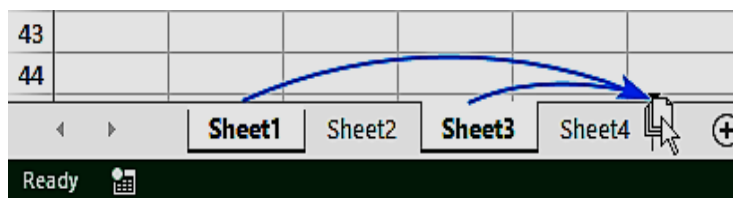


Move Excel Sheet

Method 1: Use drag and drop to move Excel sheet

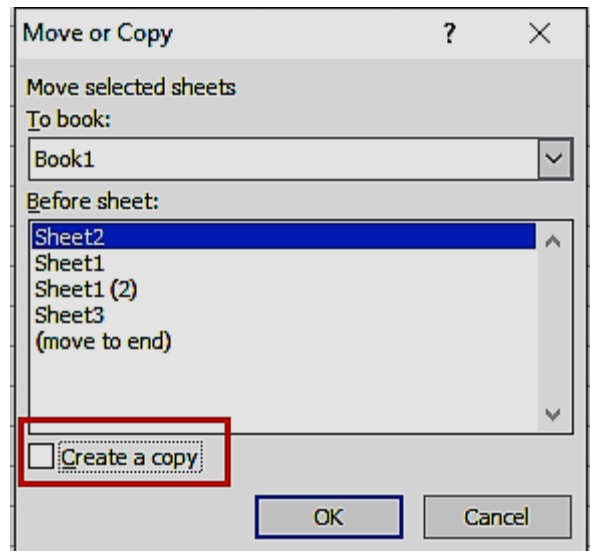
Click on the sheet(s) that you want to move and drag them to a new location.

Example: move Sheet1 and Sheet3 to the end of the workbook.



Method 2: Move the sheet within the same workbook

1. On the **Home** tab, click the **Format** command in the **Cells group** and select **move or copy sheets** OR Right-click on the sheet tab and then click **Move or Copy** from the menu. Excel will open the Move or Copy dialog box.
2. In the **Before Sheet** list box, select location you want to drop the copy.
3. The **Create a Copy** check box should be **empty**.

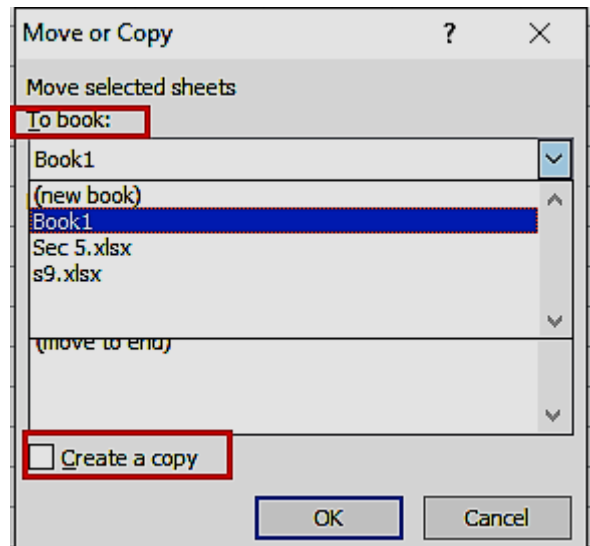


Method 3: Move the sheet to a another workbook

1. In the **To Book:** select the (**New Book**) option to move the sheet to a new workbook.
2. In the **To Book:** drop-down list, select the workbook to which you want to move worksheet.

Remember:

- If you want to copy the sheets, select the **Create a Copy** check box. Otherwise let this option deselected to move rather than copy the sheet.
- To move or copy a sheet **from one Excel file to another**, these workbooks should be previously opened.



Hide or Unhide (show) worksheets

To hide a worksheet

1. Select the worksheet that you want to hide. On the **Home** tab, click the **format** command in the **Cells** group.
2. Under Visibility, click **Hide & Unhide**, and then click **Hide Sheet**.
OR Right-click on the sheet tab and then click **Hide** from the menu.

To show a hidden worksheet

1. On the **Home** tab, click the **format** command in the **Cells** group.
2. Under Visibility, click **Hide & Unhide**, and then click **Unhide Sheet**.
3. Unhide sheet dialog box will appear; double-click the name of the hidden sheet that you want to show.
OR Right-click on the sheet tab and then click **Unhide...** from the menu.

Remember: Hide a sheet, column, or row doesn't mean delete.

Comments

Comments allow you to add [Notes](#) or more [descriptive information](#) to that cell in a [popup message](#). A red triangle appears in the upper right corner of the cell.

Adding Comments:

1. Select the cell. Click **New Comment**, in the **Comments** group on **Review** tab. Type the comment.

Note: Red triangle appears in the upper right- corner of the cell. The comment text appears when you place your mouse over the cell.

Editing Comments

Editing a comment allows you to change or add to the information you have placed within a cell as a comment.

1. Select the cell that contains the comment. Click Edit Comment in the Comments group on Review tab.
2. The Comment box appears, make your changes then click another cell.

Deleting Comments

1. Select the cell which contains the comment to be deleted.
2. Click **Delete Comment** in the **Comments** group, on **Review** tab.

Note: you can delete a comment by **Clear** command in the **Editing** group, on **Home** tab. From the list choose **Clear Comments**.

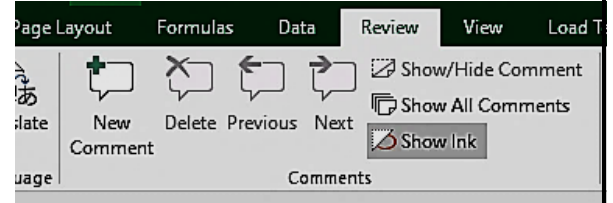
Show All Comments

By default, the comments appear only when you hover over the cell that contains the comment to show all the comments at once.

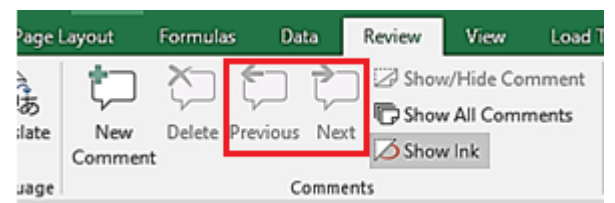
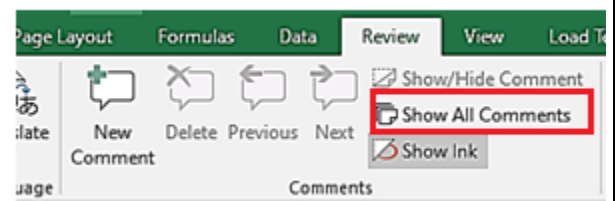
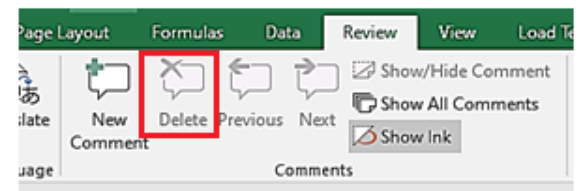
- Click **Show All Comments**, in the **Comments** group On the **Review** tab.

Navigate between Comments

Click **Previous & Next**, in the **Comments** group On the **Review** tab to navigate through the comments.



C	D	E
First	First Exam Mark out of 25	
24		
20		

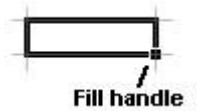


Using AutoFill

- ✓ **Copy** the same data to other adjacent cells in the row or column.
- ✓ Continue a **pattern (series)** for data like numbers, dates, and the days of a week or months.

Using auto fill to copy data



1. Select the cell that you want to copy its contents and hover over the bottom right corner of the selected cell until the mouse pointer changes to a black cross **+**.
2. Drag the *fill handle* [small black square] over the cells that you want to fill - either down a column or across a row.



Using auto fill to fill weekdays or months

1. Enter the starting day into a cell (**Sunday, Monday, Tuesday,** or whatever...) or the starting month (**April, May, whatever...**)
2. Hover the mouse pointer over the lower-right corner of the cell until the mouse pointer changes to a black cross **+**.
3. Drag the fill handle [small black square] over the cells you want to fill - either down a column or across a row.

Example 1:

AutoFill: Series - Months	AutoFill: Series - Weekdays
	

Example 2:

- ✓ If you want to copy the value 1, just drag the fill handle to adjacent column or row.
- ✓ If you want to fill for a series like 1, 2, 3, 4, 5..., click Auto Fill Options



and choose the option **Fill Series**.

	A	B	C	D
1	1			
2	1			
3	1			
4	1			
5				
6				
7				
8				
9				
10				

AutoFill: Copy Cells

	A	B	C	D
1	1			
2	2			
3	3			
4	4			
5				
6				
7				
8				
9				
10				

AutoFill: Fill Series

Example 3:

AutoFill: Fill Series		AutoFill: Copy Cells		
	A	B		
1	11/2/2020		1	11/2/2020
2	11/3/2020		2	11/2/2020
3	11/4/2020		3	11/2/2020
4	11/5/2020		4	11/2/2020
5	11/6/2020		5	11/2/2020
6			6	
7			7	
8			-	



Sorting

In Excel you can sort numbers, text or dates, in either **ascending** (تصاعدي) or **descending** (تنازلي) order. If there is blank cells, they are always placed last in a sort.



You can find sort command on:

- **Data** tab, **Sort& Filter** group.
- **Home** tab, **Editing** group.



Sort Text Data

1. Click any cell in the column that you want to sort by. On the **Home** tab, select **Sort & Filter** from **Editing** group. OR **Data** tab, **Sort& Filter** group.
2. Choose either Ascending  (Sort A to Z) or Descending  (Sort Z to A) order.

Sort Number Data

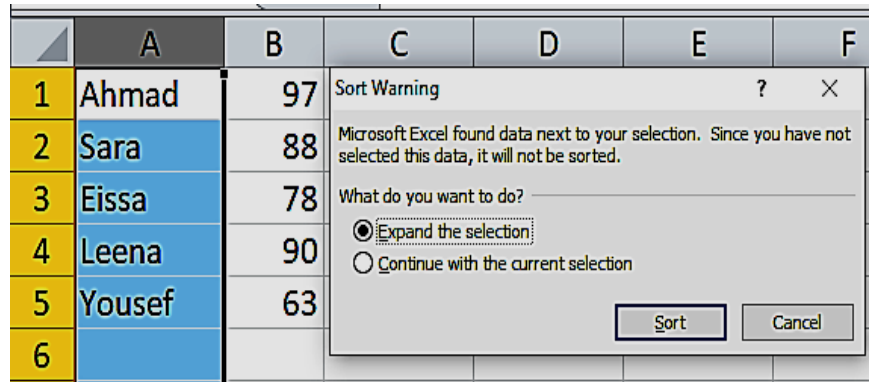
1. Click any cell in the column that you want to sort by. On the **Home** tab, select **Sort & Filter** from **Editing** group. OR **Data** tab, **Sort& Filter** group.
2. Choose either Ascending  (Sort Smallest to Largest) or Descending  (Sort Largest to Smallest) order.

Sort Date Data

1. Click any cell in the column that you want to sort by. On the **Home** tab, select **Sort & Filter** from **Editing** group. Or **Data** tab, **Sort& Filter** group.
2. Choose either Ascending  (Sort Oldest to Newest) or Descending  (Sort Newest to Oldest) order.

Warning: When you Sort your data excel will automatically expands your selection from a single cell to include all adjacent data. It's **dangerous** to select one column to sort, each row of adjacent data stay the same (i.e. excel will sort only the selected data, the data next to your selection will **not** be sorted).

Example: If we select Column A to sort in ascending order, Excel show a **Sort Warning message**



→If we choose **Expand the selection**, the result will be:

	A	B
1	Ahmad	97
2	Eissa	78
3	Leena	90
4	Sara	88
5	Yousef	63

→If we choose **Continue with the current selection**, the result will be:

Note: This option will only sort column A, which means that our data is no longer correct.

	A	B
1	Ahmad	97
2	Eissa	88
3	Leena	78
4	Sara	90
5	Yousef	63

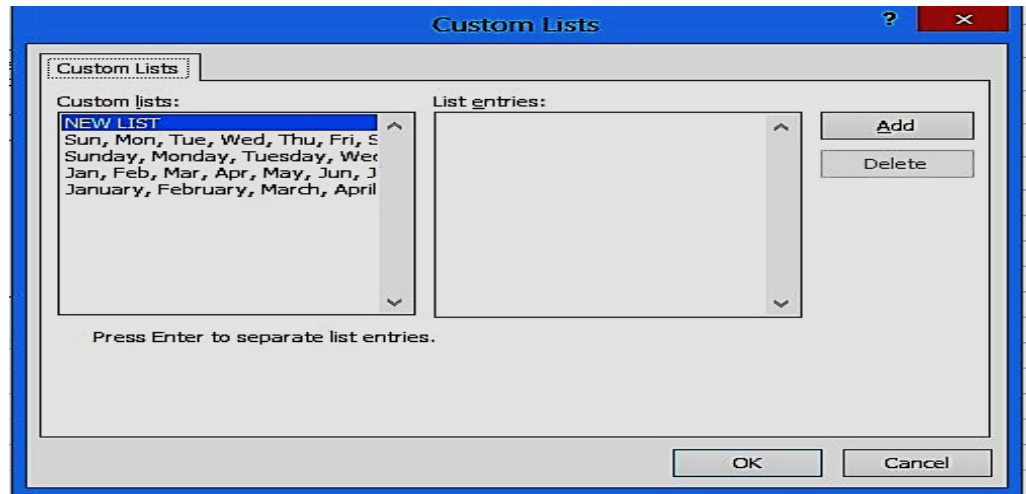
Custom Sort

1- Sorting Months and Weekdays

1. Select a cell or range in the list you want to sort. On the **Home** ribbon, select **Sort & Filter**, and choose **Custom Sort**.
2. The Sort Window will open. Select the custom List under Order. The Custom List Dialog Box will Open



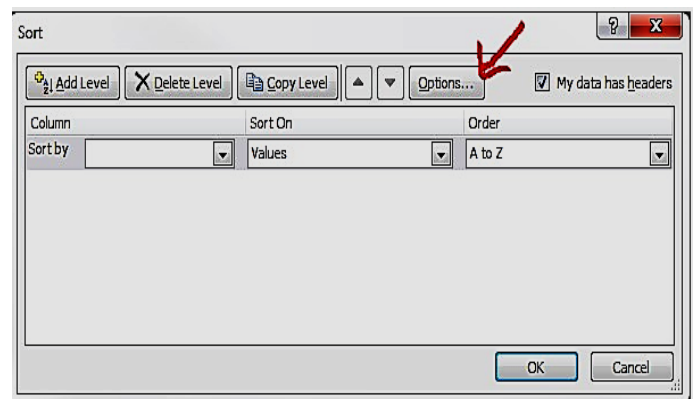
3. Select the List that you want or add your own list using **NEW LIST**, then click OK.



2- Sorting columns from Left to Right

Default Sorting is **top to bottom**, but there is another option to sort is from **left to right**.

1. On the **Home** tab, select **Sort & Filter**, and choose **Custom Sort**. The Sort Window will open.
2. Click on Options button, then in the Sort Options dialog box choose **Sort left to right**.

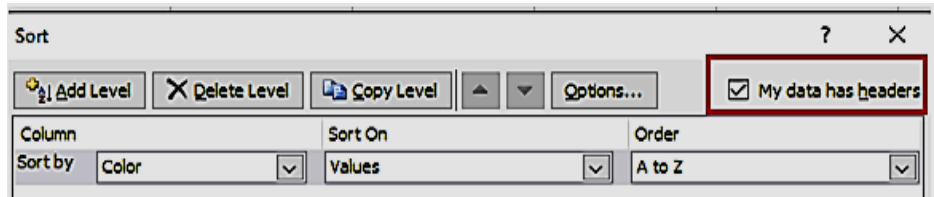
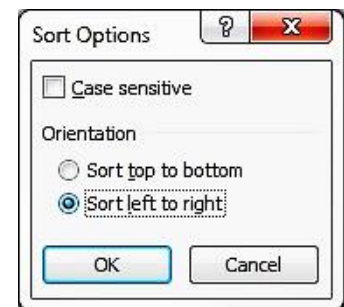


3. Select the Row number to sort. Select order, then click OK.

3- Recognizing a Header Row

In Excel you can keep the first row on top (headers) in their places when you sort your data as follow:

1. In **Custom Sort** dialog box, Check **My data has headers**.



Sort sequences

In ascending order, Numbers and Dates are sorted first, then Text.
Blank cells are sorted at the end both in ascending and descending sorts.

Example:

Data		Ascending Order		Descending Order	
1	z	1	-1	1	z
2	10/31/2020	2	7	2	w
3	a	3	10/31/2019	3	a
4	7	4	10/31/2020	4	10/31/2020
5	10/31/2019	5	a	5	10/31/2019
6	-1	6	w	6	7
7	w	7	z	7	-1

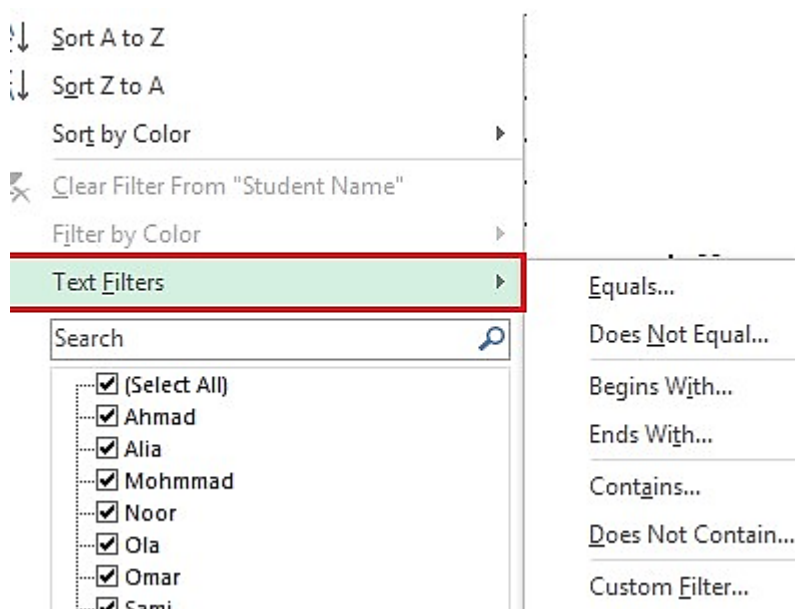
Filtering

You can filter data to display a subset of data and analyze information.
Filtering is temporarily hiding data in a spreadsheet.

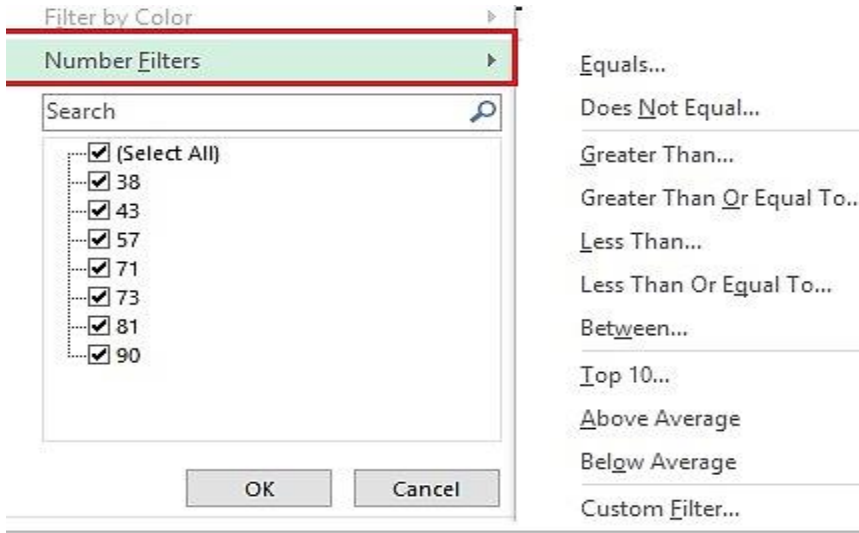
You can find Filter command on:

- **Data** tab, **Sort& Filter** group.
- **Home** tab, **Editing** group.
- ✓ Excel automatically adds Drop-down arrows besides each column heading. Click the drop-down arrow next to the heading you would like to filter.
- ✓ The Filter Type depends on the data type in that column.

Text Filters:



Number Filters:



Date Filters:

Quarter 1:

January, February, March

Quarter 2:

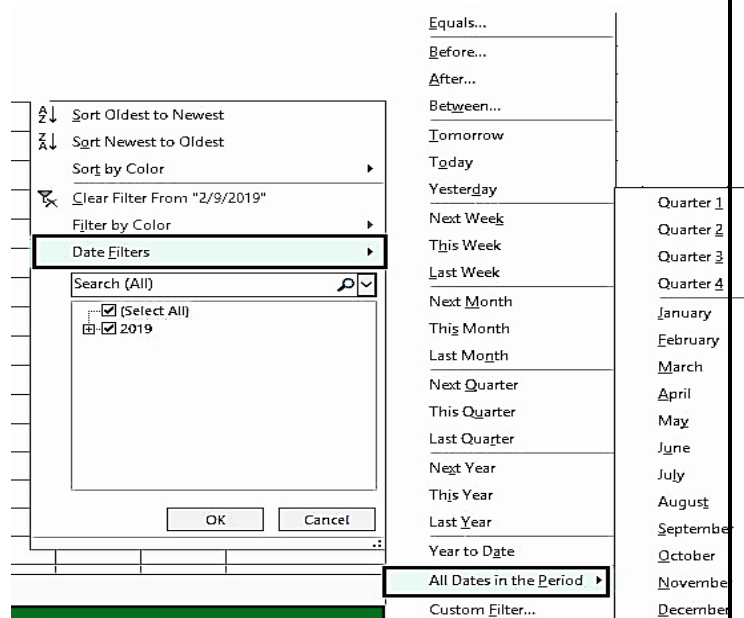
April, May, June

Quarter 3:

July, August, September

Quarter 4:

October, November, December



Example: The data below filtered by First column. **Note that** the filter icon is beside the number column and the rows 6, 8, and 9 are hidden.

	A	B	C	D	E
1	Number	Name	First	Second	Final
2	1	Ahmad	24	25	47
3	2	Kareem	20	19	40
4	3	Muna	15	13	33
5	4	Ali	15	16	35
7	6	Salma	23	24	44
10	9	Reem	17	17	37
11	10	Sami	13	11	19

To clear one filter:

1. Click on the drop-down arrows next to a filtered column.
2. Choose Clear Filter From...



Note: To remove **all** filters, click on the icon  in the **Sort & Filter** group.

Using Filter with multiple criteria [Logical operators And,Or]

→ Using And

	A	B
1	Name	Medicine
2	Omar	Science
3	Ahmad	Nursing
4	Ali	Science
5	Eissa	Nursing
6	Leena	Medicine
7	Salma	Science
8	Sara	Science
9	Yousef	Medicine

Custom AutoFilter

Show rows where:

name

begins with

And Or

ends with

	A	B
1	Name	Medicine
2	Omar	Science
4	Ali	Science
7	Salma	Science
8	Sara	Science

→ Using Or

	A	B
1	Name	Medicine
2	Omar	Science
3	Ahmad	Nursing
4	Ali	Science
5	Eissa	Nursing
6	Leena	Medicine
7	Salma	Science
8	Sara	Science
9	Yousef	Medicine

Custom AutoFilter

Show rows where:

name

begins with

And Or

ends with

	A	B
1	Name	Medicine
2	Omar	Science
4	Ali	Science
6	Leena	Medicine
7	Salma	Science
8	Sara	Science
9	Yousef	Medicine

Exercise

	A	B	C
1	Bill No.	Date	Price
2	459	11/5/2020	\$9,521.50
3	5201	11/6/2020	\$7,852.30
4	3215	6/20/2020	\$5,210.02
5	1023	1/8/2019	\$4,562.02
6	3003	10/6/2020	\$4,235.66
7	3001	7/5/2020	\$1,023.52
8	1965	5/5/2020	\$745.22
9	1478	11/1/2019	\$456.23
10	4569	11/4/2020	\$410.88
11	1000	7/3/2018	\$123.02
12	1002	9/4/2018	\$120.30
13	1923	3/7/2020	\$89.17
14	1156	10/31/2019	\$87.20

1. The Data is sorted according to ----- column in ----- order.
2. There is **1** filter on ----- column that displays the bills No. **greater than or equal to 1000**.
3. The suitable filter to show all the bills in 11/5/2020 is -----.
4. The suitable filter to show all the bills except the bill 3001 is-----.
5. The suitable filter to show all the bills in April, May, and June is -----.
6. The suitable filter to show top 5 bills value is-----.
7. The suitable filter to show the bill's number in the range [**1000,2000**]---

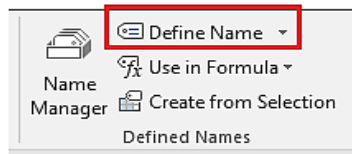
Naming a Cell or Range of cells

You can assign a name to a cell or a range of cells that allow you to use this name in formulas or functions in your worksheets.

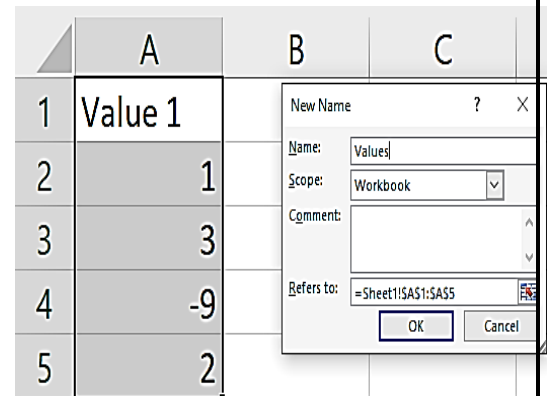
Naming cells

1. Select the cell or cell range that you want to name.

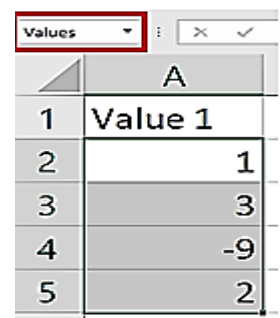
2. Click **Define Name** in the **Defined Names** group on the **Formulas** tab.



3. The New Name dialog box appears.



In the Name text box, type the name, in this example we type **Values**. Now when you select the cells from **A2:A5** the name **Values** will appear in the name Box.



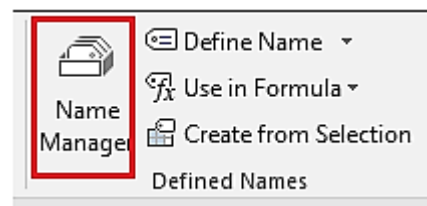
Remember:

- ✓ Range Name is up to a 255-characters.
- ✓ Range names are not case-sensitive.
- ✓ The first character of range name must be a letter, or an underscore.
- ✓ No spaces in a range name and no special symbols.
- ✓ You cannot use a cell address as a name. For example, A2 or AB123.

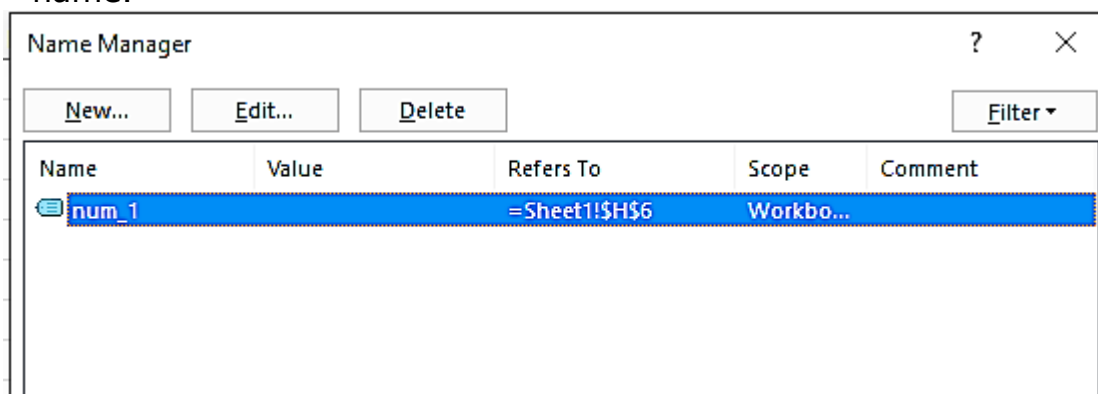
Managing Range Names

The Name Manager provides a list of all names in the current workbook which you can create **new** range names, **edit**, or **delete**.

Click **Name Manager** in the **Defined Names** group on the **Formulas** tab. The Name Manager Window will open:

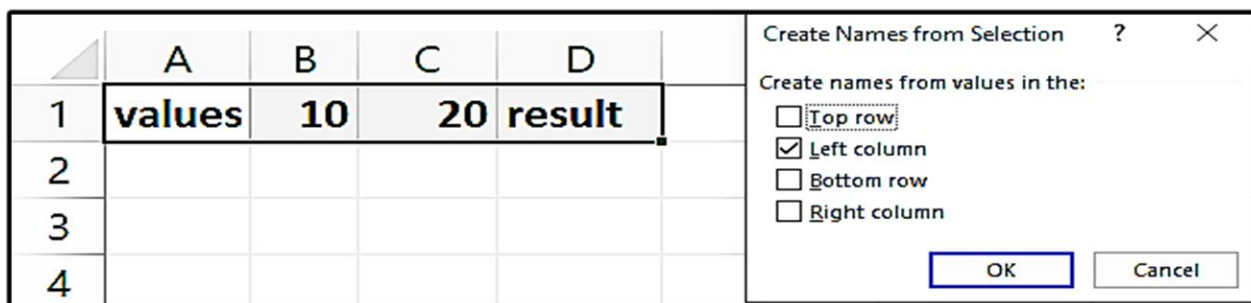


- Use **New** button to create new names.
- Use **Delete** button to delete the selected name.
- Use **Edit** button to edit the name or range of cells for the selected name.



Naming Cells using row or columns labels:[Create from Selection]

1. Select the cell range that you want to name, in this example **A1:D1**. Click the **Create from Selection** command in the **Defined Names** group on the **Formulas** tab.



Choose the location that contains the labels (names) by selecting the **Top row**, **Left column**, **Bottom row**, or **Right column** check box.

→In this example if we Check the:

Left column the name will be **values** for cells **B1:D1**.

Right column the name will be **result** for cells **A1:C1**.

Paste Special

By default, Excel copies **all** the information (**content, formats, comments...**) when you paste the data in the selected cells.

1. Select the cell(s) that you want to copy or cut.
2. Select the cell(s) where the results should be pasted.
3. Select Paste Special **from the clipboard group on the home tab**.
4. The *Paste Special dialog box* appears. Select one of the following options:

- **All:** pastes all content (formats, information, and formulas) in the copied cell; it is the default option
- **Formulas:** pastes only the formula but remember that any relative cell references within the formula will be changed according to the new location.
- **Values:** pastes only the contents, if you copy a formula and use this option this will copy only the result (values) of the formula from the selected cell.
- **Formats:** pastes the formatting applied to the cell without content.
- **Comments:** pastes only the comments from the copied cell (s) without contents or any formats.

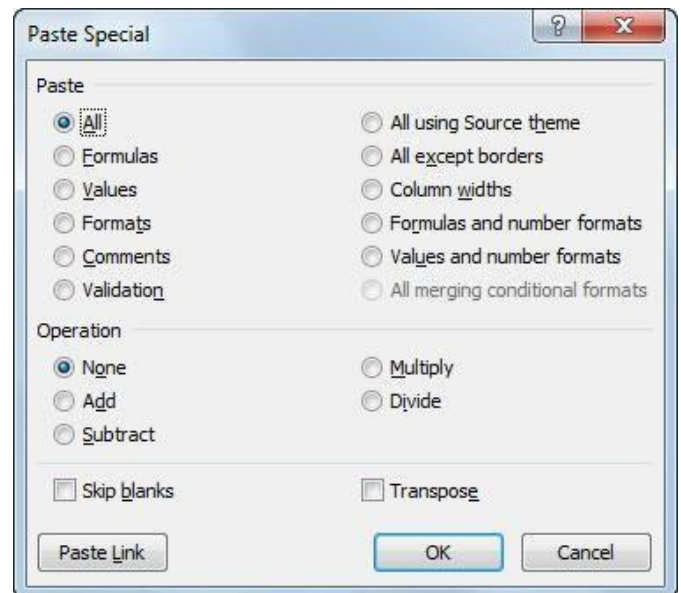
Operation:

Used to perform some calculations based on the values in the copied or cut cells and the values in the destination cells:

- **Add:** Add the values that were copied or cut to the values in the destination cells [where you want to paste].
- **Subtract:** Subtract the values that were copied or cut to the values in the destination cells [where you want to paste].
- **Multiply:** Multiply the values that were copied or cut to the values in the destination cells.
- **Divide:** Divide the values that were copied or cut to the values in the destination cells.

Transpose

It used to change the orientation of the pasted cells. By default, the pasted cells run down across the rows of a single column, the transpose option change the orientation to be across the columns of a single row.



Working with Formulas

Operators in Excel

1. Arithmetic [Mathematical] operations:

- Addition +
- Subtraction -
- Division /
- Multiplication *
- Exponent ^

Priority:

1. Parenthesis
2. Exponent
3. Division and Multiplication from left to right.
4. Addition and Subtraction from left to right.

2. Relational [Comparison] Operators:

- Greater than >
- Greater than or equal >=
- Less than <
- Less than or equal <=
- Equal =
- Not equal < >

Priority: All have the same priority from left to right.

Remember → The result of relational operators is either **TRUE** or **FALSE**

Example:

$$=10-4/2+3*2^2$$

Answer = 20

$$=(10-4)/2+3*2^2$$

Answer = 15

$$= 50 = 100$$

Answer = FALSE

	A	B
1	10	= -A1 + 3*10
2	-5	= A3 <> 6-3
3	3	= A1 < 100

Remember: Avoid using numbers instead of cell reference with that number into a formula. Wherever possible, refer to the cell reference with that number in it.

Using defined Cell Names in Formulas

Example:

1. Select the cell **B2** that you want to name.
2. Click **Define Name** in the **Defined Names** group on the **Formulas** tab. The New Name dialog box appears. In the Name text box, type the name **Bonus**.
3. In the cell **C4** Write the formula **=C4 +** then go to the Formulas tab; Click on **Use in Formula** in the **Defined Names** group, then choose the name, and then Press Enter.

1			
2	Bonus		2
3	Student Name	Mark	Mark+bonus
4	Ahmad Ali	57	=B4+Bonus
5	Mohmmad Fadi	43	
6	Omar Ahmad	81	
7	Sara Kareem	69	
8	Noor Yousef	90	
9	Sami Ibraheem	86	

Note: if the name is **Not** defined this will result in **#Name?** Error in the formula.

Copy and Paste formulas

There are two types of cell references used in formulas:

- ✓ Relative references: **changed** when a formula is copied or cut to another cell. By default, all cell references are relative reference.
- ✓ Absolute references: remain **fixed**, when a formula is copied or cut to another cell. It contains a dollar sign **\$** before the row or column header, or both.

Using Relative Reference

1. Type the formula **= C2*D2*E2** to calculate the total mark value. Press Enter to display the result.

	A	B	C	D	E	F
1	Number	Name	First	Second	Final	Total
2	1	Ahmad	24	25	47	=C2+D2+E2
3	2	Kareem	20	19	40	
4	3	Muna	15	13	33	
5	4	Ali	15	16	35	
6	5	Noor	7	10	23	
7	6	Salma	23	24	44	
8	7	Omar	12	10	23	
9	8	Alia	12	15	25	
10	9	Reem	17	17	37	
11	10	Sami	13	11	19	

2. Copy this formula to the cells F3,F4,.....F11.Note that the formula will be copied to the selected cells with relative references,

	A	B	C	D	E	F
1	Number	Name	First	Second	Final	Total
2	1	Ahmad	24	25	47	96
3	2	Kareem	20	19	40	79
4	3	Muna	15	13	33	61
5	4	Ali	15	16	35	66
6	5	Noor	7	10	23	40
7	6	Salma	23	24	44	91
8	7	Omar	12	10	23	45
9	8	Alia	12	15	25	52
10	9	Reem	17	17	37	71
11	10	Sami	13	11	19	43

3. The relative references for each cell, depending on their rows.

SUM X ✓ fx =C5+D5+E5

	A	B	C	D	E	F
1	Number	Name	First	Second	Final	Total
2	1	Ahmad	24	25	47	96
3	2	Kareem	20	19	40	79
4	3	Muna	15	13	33	61
5	4	Ali	15	16	35	=C5+D5+E5
6	5	Noor	7	10	23	40
7	6	Salma	23	24	44	91
8	7	Omar	12	10	23	45
9	8	Alia	12	15	25	52
10	9	Reem	17	17	37	71
11	10	Sami	13	11	19	43

Using absolute cell Reference

Problem: suppose that you write the formula =F2+C13 in G2 When you copy the formula down in the column, Excel changes each cell reference to match the new row. We need to keep C13 fixed in the pasted cells so we have to change the cell reference from **relative reference C13** to **absolute reference as \$C\$13**.

In the Example below we want the value of *bonus* to be added for total:

1. Type the formula

=F2+\$C\$13

2. Now copy this formula to the other cells. Note that F2 changed to F3 [relative] while C13 remain fixed.

	A	B	C	D	E	F	G
1	Number	Name	First	Second	Final	Total	Total with bonus
2	1	Ahmad	24	25	47	96	=F2+\$C\$13
3	2	Kareem	20	19	40	79	
4	3	Muna	15	13	33	61	
5	4	Ali	15	16	35	66	
6	5	Noor	7	10	23	40	
7	6	Salma	23	24	44	91	
8	7	Omar	12	10	23	45	
9	8	Alia	12	15	25	52	
10	9	Reem	17	17	37	71	
11	10	Sami	13	11	19	43	
12							
13		Bonus	2				

1	Number	Name	First	Second	Final	Total	Total with bonus
2	1	Ahmad	24	25	47	96	98
3	2	Kareem	20	19	40	79	=F3+\$C\$13
4	3	Muna	15	13	33	61	63
5	4	Ali	15	16	35	66	68
6	5	Noor	7	10	23	40	42
7	6	Salma	23	24	44	91	93
8	7	Omar	12	10	23	45	47
9	8	Alia	12	15	25	52	54
10	9	Reem	17	17	37	71	73
11	10	Sami	13	11	19	43	45
12							
13		Bonus	2				

Note: To make a cell reference absolute, Press F4 from keyboard.

Formula Errors

#####: occurs when the column is not wide enough to display its content.

Solution: Increase the column width.

2/16/2019		fx 2/16/2019	
A	B	A	B
1	#####	1	Saturday, February 16, 2019
2		2	

#DIV/0! Error: occurs when a formula divide a number by 0 or by empty cell. In the example below the value of A2 is 0 in the given formula.

Solution: You have to change the value of cell A2 to any non-zero value.

fx =A1/A2		fx =A1/A2	
A	B	A	B
1	#DIV/0!	1	10
2	0	2	5

#VALUE! Error: occurs when a formula contains wrong type of argument. In the example below the value of A2 is TEXT in the given formula.

Solution: You have to change the value of cell A2 to a number.

fx =A1+A2		fx =A1+A2	
A	B	A	B
1	#VALUE!	1	10
2	B2	2	20

#NAME? Error: occurs when Excel does not recognize the name used in a formula. In the example below the value1 in the given formula is not defined in Excel.

Solution: You have to define this name [Formulas Tab → Defined Names group → Define Name command]

#REF! Error: occurs when a formula refers to a cell reference that is NOT valid.

Solution: Use a valid cell reference by deleting #REF! Argument in the formula. In the example below the given formula references A1 and A2. If we delete row 2 the reference of A2 is not valid anymore.

Notes about Excel formulas:

- The empty (blank) cell is considered **0** when used within a formula.
- In Excel logical values (FALSE, TRUE), if they used in a formula the value of TRUE is **1** and the value of FALSE is **0**.
- It is not possible to use texts in mathematical formula. **#VALUE! Error.**
- It is not possible to use text and logical values inside the quotation marks "" in the formula, it is considered as **#VALUE! Error.**
- In formulas, numbers and date between quotation marks "" is correct.
- Make sure that date is written in a correct format – otherwise it is considered as **#VALUE! Error.**
- Writing any wrong name into the formula is considered as **#NAME? Error**, unless the name is a defined.
- If we copy a formula with a defined name, it will be pasted as it in the destination cell.

Examples:

Example 1:

	A	B	C	D	E
1	10	5	100		
2	20	2	2		
3	30	1	1		
4	50	7		=A2+B3	
5					
6					

IF we copy the following formula: $D4=A2+B3 \rightarrow 21$ to the cells given below the result will be as follow:

D3 =A1+B2 \rightarrow 12

D5 =A3+B4 \rightarrow 37

E4 =B2+C3 \rightarrow 3

E6 =B4+C5 \rightarrow 7

C4 =#REF!+A3 \rightarrow #REF!

Example 2:

IF we copy the following formula: $D4 =A2+ \$B\$3 \rightarrow 21$ to the cells given below the result will be as follow:

D3 =A1+\$B\$3 \rightarrow 11

D5 =A3+\$B\$3 \rightarrow 31

E4 =B2+\$B\$3 \rightarrow 3

F6 =C4+\$B\$3 \rightarrow 1

C4

=#REF!+\$B\$3 \rightarrow #REF!

	A	B	C	D	E	F
1	10	5	100			
2	20	2	2			
3	30	1	1			
4	50	7		=A2+\$B\$3		
5						
6						
7						

Example 3:

If we copy the following formula: $D4 = A2 + B\$3 \rightarrow 21$ to the cells given below the result will be as follow:

$$D3 = A1 + B\$3 \rightarrow 11$$

$$D5 = A3 + B\$3 \rightarrow 31$$

$$E4 = B2 + C\$3 \rightarrow 3$$

$$F5 = C3 + D\$3 \rightarrow 1$$

	A	B	C	D	E	F
1	10	5	100			
2	20	2	2			
3	30	1	1			
4	50	7		=A2+B\$3		
5						

Example 4:

If we copy the following formula: $D4 = A2 + \$B3 \rightarrow 21$ to the cells given below the result will be as follow:

$$D3 = A1 + \$B2 \rightarrow 12$$

$$D5 = A3 + \$B4 \rightarrow 37$$

$$E4 = B2 + \$B3 \rightarrow 3$$

$$F5 = C3 + \$B4 \rightarrow 8$$

	A	B	C	D	E	F
1	10	5	100			
2	20	2	2			
3	30	1	1			
4	50	7		=A2+\$B3		
5						

Example 5:

	A	B	C
1	15	1	=A1/FALSE
2	20	2	
3	30	3	=A1*B2
4	40	4	=VAL+B2
5			

1. The result of formula in C1 \rightarrow #DIV/0!
2. The result of formula in C3 \rightarrow 30
3. The result of formula in C4 \rightarrow 32
4. The result of copying the formula in C4 and paste it in C5 is:
 $=VAL+B3 \rightarrow 33$
5. The result of C3 and C4 after deleting the row 2 is: \rightarrow #REF!
6. The result of C3 and C4 after selecting row 2 and pressing the delete key is (i.e. Delete the content NOT Row): C3 \rightarrow 0 C4 \rightarrow 30

Example 6:

Note that **NUMBER** is a defined name for the cell A9

	A	B	C	D	E	F	G
1	15		=A1+A2	=A1+A4	=A1+A8	=A8+NUMBER	=A5+10
2	1/20/1900		=A1+"1/1/1900"	=A1+TRUE	=A1+"7"	=A8+NUMBER1	="A1"+10
3	16/11/2020		=A1+A3	=A1+"TRUE"	=A1+A6	=A8+"NUMBER"	
4	TRUE		=A1+"13/1/1900"		=A1+A7		
5	A1						
6	"7"						
7							
8	7						
9	5						
10							

→The Results of these formulas:

	A	B	C	D	E	F	G
1	15		35	16	22	12	#VALUE!
2	1/20/1900		16	16	22	#NAME?	#VALUE!
3	16/11/2020		#VALUE!	#VALUE!	#VALUE!	#VALUE!	
4	TRUE		#VALUE!		15		
5	A1						
6	"7"						
7							
8	7						
9	5						
10							