College of Defence Management

Victory through Excellence

Introduction to

MS Excel

Pre-Course Training Handout

PRE-COURSE TRAINING HANDOUTS: MICROSOFT EXCEL

CONTENTS

The purpose of this handout is to provide an overview of Microsoft Excel tools and functions mostly used in the quantitative subjects taught at CDM. Basic working knowledge of MS Excel will assist the participant officers in grasping the quantitative subjects swiftly.

Ver 1.2 (Apr 2024)

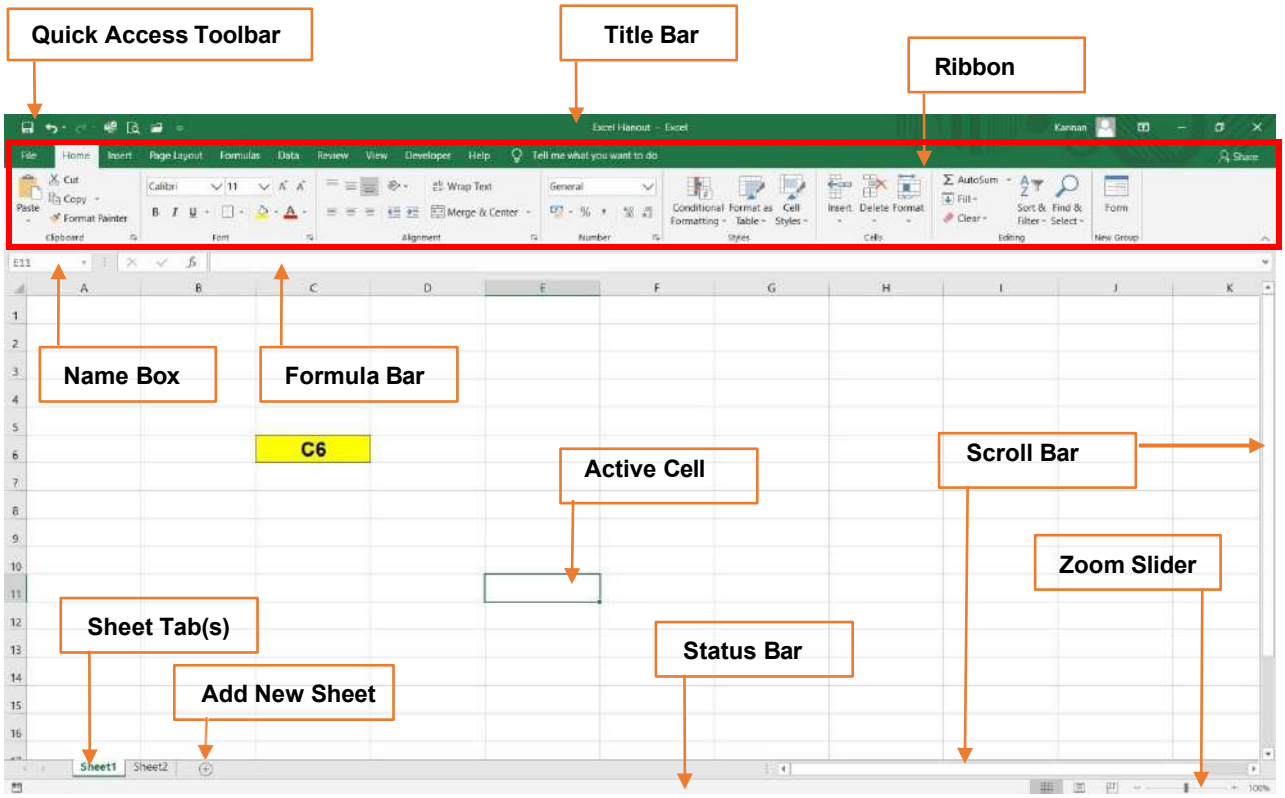
INTRODUCTION TO MS EXCEL

What is Excel?

1. **Microsoft Excel** is a spreadsheet application that is commonly used for a variety of purposes. At its core, Excel is a table consisting of rows and columns. Excel is composed of rows and columns and uses a spreadsheet to manage, analyse, and present data. Data is stored in individual cells that are usually organized in a series of columns and rows in a worksheet; this collection of columns and rows is referred to as a table. Excel also includes many powerful tools that can be used to organize and manipulate large amounts of data, perform complex calculations, create professional-looking charts, enhance the appearance of worksheets, and more.

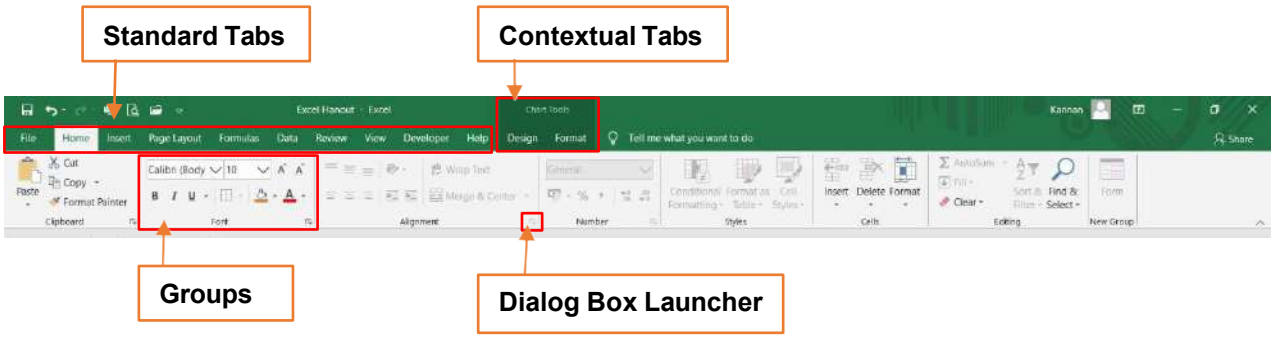
Excel Interface

2. The Excel interface is where you see and use the tools in Excel on the screen. This includes the way the tools are organized and presented to you, the software user. An Excel workbook is an Excel file that can contain multiple, somewhat independent spreadsheets called Excel worksheets.



3. **Ribbon**. The Ribbon is designed to help you quickly find the commands that you need to complete a task. It consists of a set of ***task-specific tabs***. The standard tabs are visible at all times. Other tabs, known as ***contextual tabs***, appear only when you create or select certain types of objects (such as images or charts). These tabs are indicated by coloured headers and contain commands that are specific to working with the selected object. Clicking a tab displays a set of related commands that are organized into logical groups. Some commands include an integrated or separate arrow. Clicking the arrow displays a menu of options available for the command. If a command on the Ribbon appears dimmed,

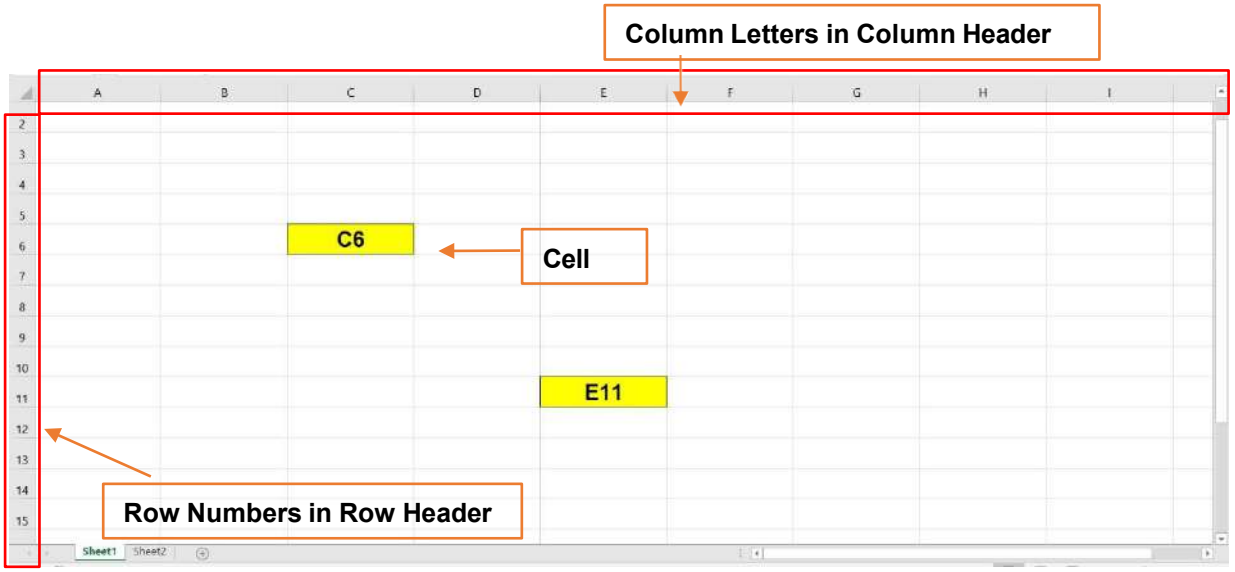
it is unavailable. A ***dialog box launcher*** appears in the lower-right corner of most groups on the Ribbon. Clicking it opens a related dialog box or task pane that offers additional options or more precise control than the commands available on the Ribbon.



Quick Tips …
You can ***Collapse the Ribbon*** by clicking the Collapse the Ribbon button on the right side of the Ribbon or by double-clicking the current tab. When the Ribbon is collapsed, only the tab names are visible. You can expand the Ribbon by double-clicking any tab.

Handy to Know…
Pointing to a command on the Ribbon displays its name, description, and keyboard shortcut (if it has one) in a ScreenTip.

4. **Worksheet**. You use worksheets to store, manipulate, and display data. The primary storage unit for data in a worksheet is a rectangular-shaped **cell** arranged in a grid pattern in every sheet. Individual cells of data are identified and organized using the vertical column letters and horizontal row numbers of a worksheet, which create a cell reference, such as A1, D15, or Z467. By default, the worksheets are named Sheet1, Sheet2, Sheet3, and so on, but you can change these names.



- **Column Letters**. Columns run vertically on a worksheet, and each one is identified by a letter in the column header like A, B, ….. Z, AA, AB and so on.
- **Row Numbers**. Rows run horizontally in a worksheet and are identified by a number starting from 1 in the row header.

- **Cell**. Cells are the rectangular boxes located in the central area of a worksheet. Data entered into a worksheet is stored in a cell. Each cell can hold only one piece of data at a time. A cell is the intersection point of a vertical column and a horizontal row. **Each cell in the worksheet can be identified by a cell reference, which is a combination of letters (column reference) and numbers (row reference)** such as A1, F456, or AA34. In the above image C6 cell refers to Column C and Row 6.

Quick Tips …

- It is a best practice to use **Tab** button on the keyboard to move between cells in a workbook.
- **Name Box** located next to the formula bar displays the cell reference or the name of the active cell.
- Scrolling with the mouse does not change the location of the active cell. To change the active cell, you must click a new cell after scrolling.

General Info…

Worksheet specifications for current versions of Excel include:

- 1,048,576 rows per worksheet
- 16,384 columns per worksheet
- 17,179,869,184 cells per worksheet
- A limited number of sheets per file based on computer memory

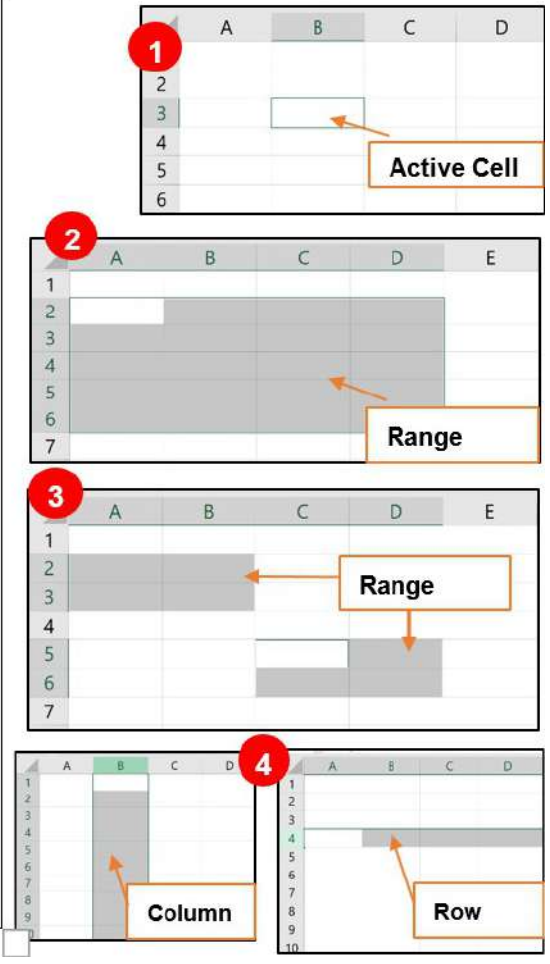
5. **Selecting Cells, Rows and Columns**. To work with a cell, you must first select it. When you want to work with more than one cell at a time, you can quickly select ranges, rows, columns, or the entire worksheet.

1. To select a **single cell** - Click the desired cell

2. To select a **range of cells** - Click the first cell that you want to include in the range, hold down the Shift key, and then click the last cell in the range. Or, drag from the first cell in the range to the last cell. Note that when a range is selected, every cell in the range is highlighted, except for the active cell. You can deselect a range by pressing any arrow key or by clicking any cell in the worksheet.

3. To select **non-adjacent cells or ranges** - Select the first cell or range, hold down the Ctrl key, and then select the other cells or ranges.

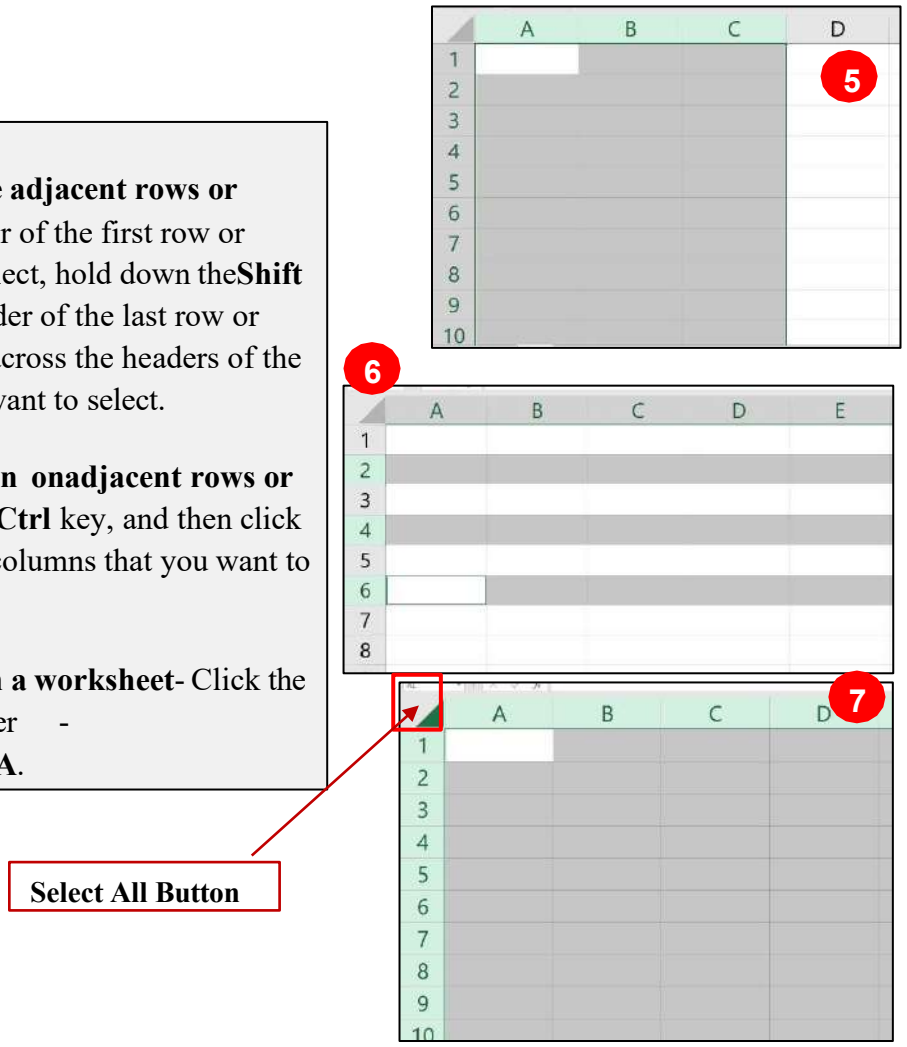
4. To select a **single row or column** - Click the header of the row or column that you want to select. Note that when a row or column is selected, every cell in the row or column is highlighted, except for the active cell. You can deselect a row or column by pressing any arrow key or by clicking any cell in the worksheet.



5 To **select multiple adjacent rows or columns** - Click the header of the first row or column that you want to select, hold down the**Shift** key, and then click the header of the last row or column. Alternately, drag across the headers of the rows or columns that you want to select.

6 To **select multiple n onadjacent rows or columns** - Hold down the **Ctrl** key, and then click the headers of the rows or columns that you want to select.

7 To **select all cells in a worksheet**- Click the Select all button in the upper - worksheet. Or, press **Ctrl+A**.



Quick Tips…

- Use the ***arrow keys*** on your keyboard to move (navigate) from one cell to another.
- Use the ***Tab key*** to move horizontally to the right. Hold down the ***Shift key and press the Tab key*** to move horizontally to the left.
- Use the ***Enter key*** to move vertically downward. Hold down the ***Shift key and press the Enter key*** to move vertically upwards.

6. **Editing Data in Worksheets**. After creating a workbook, you can start adding data to a worksheet. If you need to make changes, you can easily edit the data to correct errors, update information, or remove information you no longer need.

- You can add data by entering it directly in a cell or by using the Formula bar. A cell can contain a maximum of 32,767 characters and can hold any of three basic types of data: text, numbers, or formulas.

To Enter Data

- Select the cell in which you want to enter text/number (Click on the cell with the mouse or navigate through the keyboard arrow keys where you want the data).
- Type the desired text/number in the cell.
- Press the Enter key on the keyboard or click on another cell with the mouse.

To Edit Data

- You can edit the contents of a cell directly in the cell or by using the Formula bar.
- **To edit data** - Double-click the cell that contains the data you want to edit. The cursor (a blinking vertical line) appears in the cell in the location that you double-clicked.
- **To insert characters** - click where you want to make changes, and then type the new characters.
- **To delete characters** - click where you want to make changes, and then press the Backspace or Delete key.
- **To replace data** - select the cell that contains the data you want to replace. Type the new data, and then press the Enter key.
- **To delete data** - select the cell that contains the data you want to delete, and then press the Delete key.

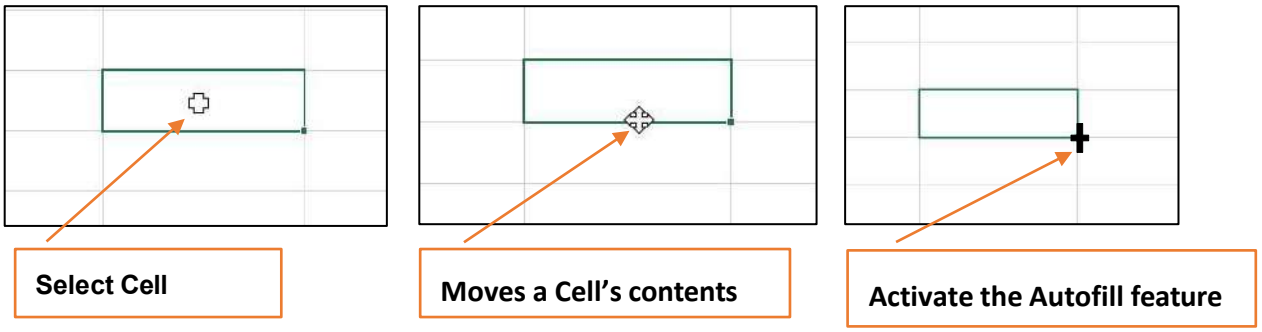
Note …

- A number that does not fit within a column is displayed as a series of hash signs **(#####)**. To accommodate the number, increase the column width.
- By default, pressing the Enter key will move you to the cell below the active cell.

Handy to Know…

- Pressing the Backspace key deletes the character to the left of the cursor; pressing the Delete key deletes the character to the right of the cursor.

7. **Selection Using the Mouse.** The mouse pointer changes shape depending upon the context.



- **General Select - Thick 'plus' shape**, appears when the mouse is anywhere over the worksheet grid. A range of cells can be selected by clicking and dragging the mouse over the cells. You can select cell or cells, not next to each other by holding the Ctrl button before dragging the second selection.

- **Move Cell (or range of cells) - Mouse arrow with a four-pointed arrow incorporated,** hover the mouse over the black edge of a selected cell or selected range to make it appear. Click and drag to move cell contents.
- **Fill/Copy - Thin 'plus' shape,** used for copying cell content or using the autofill function. Select a cell and then hover the mouse pointer over the small square in the lower right corner of the cell.
- **Column/Row Resize - A black line with arrows pointing in two directions** is used for making the columns or rows wider or narrower. Hover the mouse pointer over the line on the column or row headings that separates columns or rows. Position it over the line on the right hand of the column to resize, or the lower-line of the row to resize. Click and drag to manually resize or double-click to resize to widest entry. Multiple columns or rows can be resized at the same time by selecting them first, then double-clicking or clicking and drag on any of the column/row dividers on the selection.

8. **Filling a Series**. A ***series*** refers to a sequence of ordered entries in adjacent cells, such as the days of the week or months of the year. The ***fill*** technique can be used to create these in a worksheet for you, reducing the amount of time taken for data entry, and ensuring that the spelling is correct. Excel provides days and months as specially built-in series that you can access.

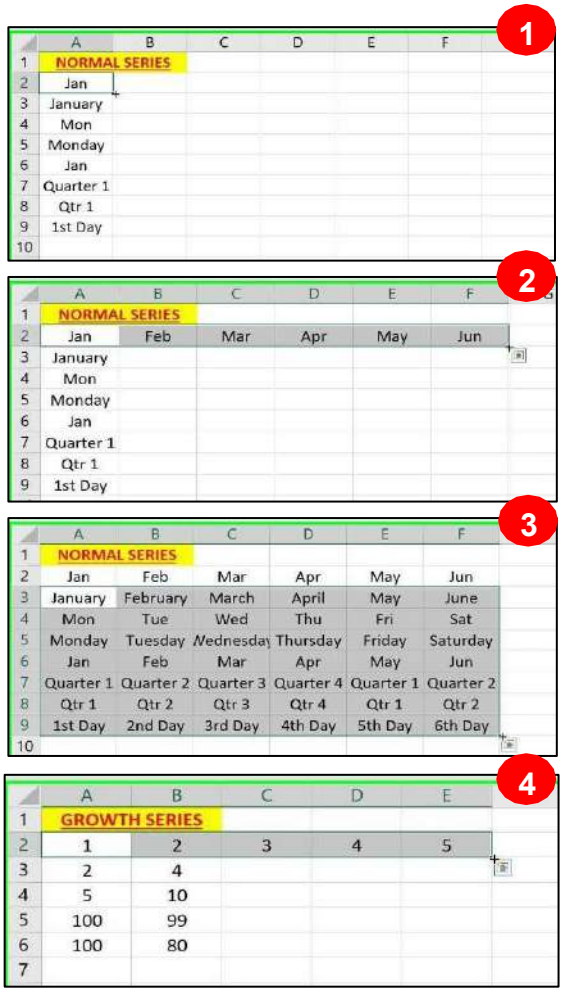
1. Click on cell A2.

2. Move the mouse pointer to the small square (the ***fill handle***) at the bottom right corner of the cell until the mouse pointer appears as a thin, black cross. Drag the mouse pointer to F2, Excel will fill the range with the first six months of the year…

3. Click on cell A3 and repeat steps 2 and 3 to create the series of months with their full names. You can also fill more than one row at a time… Select the range A3:A9. Repeat steps 2 to fill across to column F.

4. You can also fill in a series of values that fit a simple linear trend or an exponential growth trend by using the fill handle or the Series command.

Examine each of the series created by the filling process.



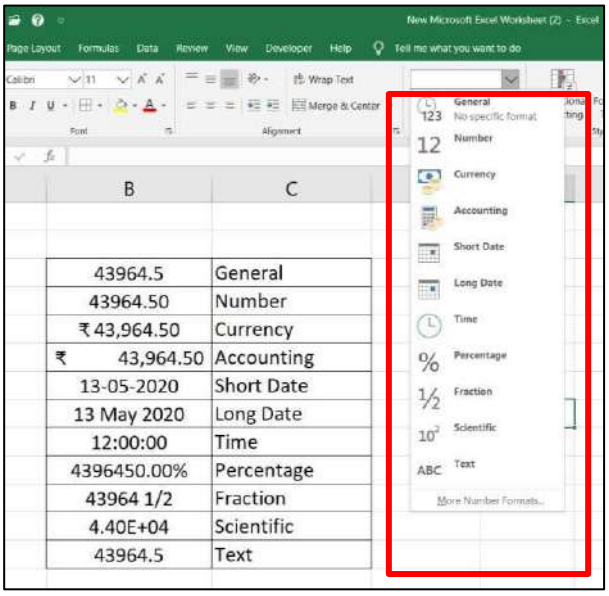
For Your Reference…	Handy to Know…
• To ***fill a series*** - Click on the first cell in the series and Drag from the fill handle across as many columns as required	• As you drag the fill handle across, a **tool tip** appears below the fill pointer displaying the current value in the series. This is handy when you want to end on a particular month, day or value.

Formatting Text and Numbers

9. In Excel, there are always two aspects to a number: **how the number is displayed on the screen (known as formatting) and the underlying value of the number**. Take 2% as an example – on the screen, it is formatted to appear as a number with a percentage sign, whereas the real value in the cell is 0.02.

10. All calculations in Excel are performed using numbers – this is only logical. So, when you want to perform a calculation, you type the numbers in various cells, then create formulas giving reference to those numbers. How do you show what those numbers represent? For example, how do you show you are working with currency, or percentages, or even dates (which in Excel are really numbers)? Excel allows you to show these representations using number formatting. With number formatting, you change the way a number looks so that it makes immediate sense to the reader of your worksheet. The underlying value of the number, however, remains unchanged. For example, instead of showing sales tax in a worksheet as 0.1, you show it as 10%; to show 12889.95 as currency it would appear as $12,889.95 or €12,889.95 (depending upon the currency you are working with), and to show 44104 as a date you show it as 30-Sep-2020 (remember, dates are actually numbers representing the number of days from 01 Jan 1900).

11. Formatting can also be applied as you type. For example, if you type 30/9/2020 Excel will place the number 44104 in the cell but will format this number as a date and show it as you typed it. There is also a range of number formatting options on the ribbon that allow you to apply formatting to the numbers after they have been entered into a worksheet.



12. The **Number Format** command in the **Number** group on the **Home** tab contains a drop arrow that provides a gallery of the most commonly used number formats. You can apply these formats easily and quickly to a selected cell or range of cells in the worksheet. In the example here, ***number 43964.50 has been used to depict how the same number is displayed in different formats by Excel***.

Cell References

13. While you can create simple formulas in Excel manually (for example, =2+2 or =5*5), most of the time you will use cell addresses to create a formula. This is known as ***making a cell reference***. Using cell references will ensure that your formulas are always accurate because you can change the value of referenced cells without having to rewrite the formula. There are three types of cell references: ***relative, absolute*** *and* ***mixed***. Relative and absolute references behave differently when copied and filled to other cells. ***Relative references change when a formula is copied to another cell.***
Absolute references, on the other hand, remain constant, no matter where they are copied.

- **Relative Cell References**. By default, all cell references are relative references. When copied across multiple cells, they change based on the relative position of rows and columns. For example, if you copy the formula =A1+B1 from row 1 to row 2, the formula will become =A2+B2. Relative references are especially convenient whenever you need to repeat the same calculation across multiple rows or columns.

- **Absolute Cell References**. Sometimes we need to copy a formula so that the content of cells associated with this formula must be fixed. In that condition, the absolute cell references can be used. In this type of cell references, we can keep the row and column constant. An absolute reference is designated in the formula by ***addition of a dollar sign ($).*** Eg. B2

- **Mixed Cell References**. It contains dollar signs attached to either the letter or the number in a reference. Eg. $B2 or B$4. It is a combination of relative and absolute references.

Reference	*Reference & Particular*	*Keys in the keyboard*
A1	***Relative Reference*** - The column and the row change when copied.	***Default*** or Press F4 four times to change from other references
A1	***Absolute Reference*** - The column and the row do not change when copied.	Press F4
A$1	***Mixed Reference*** - The row does not change when copied.	Press F4 twice
$A1	***Mixed Reference*** - The column does not change when copied.	Press F4 three times

Handy to Know…

- ***When writing a formula, you can press the F4 key on your keyboard to cycle between relative absolute and mixed cell referencing options. This is an easy way to quickly insert an absolute reference.***

EXCEL FORMULAS AND FUNCTIONS

Operators

14. Operators specify the type of calculation that you want to perform on elements in a formula - such as addition, subtraction, multiplication, or division. There are four different types of calculation operators: arithmetic, comparison, text concatenation, and reference. Commonly used ones are listed below:-

Arithmetic Operator	***Example***	***Meaning***
+ (plus sign)	=A1+A2	Adds values in cells A1 and A2
- (minus sign)	=C4-3	Subtracts 3 from value in cell C4
* (asterisk)	=N10*1.05	Multiplies values in cell N10 by 1.05
/ (forward slash)	=D4/J8	Divides value in cell D4 by cell J8
% (percent sign)	=20%	20 percentage or 0.20
^ (caret)	= E5^2	Finds the square of value in cell E5
Comparison Operator	***Example***	***Meaning***
= (equal sign)	=A1= B1	Cell A1 is equal to cell B1
> (greater than sign)	=A1>B1	Cell A1 is greater than cell B1
< (less than sign)	=A1<B1	Cell A1 is less than cell B1
>= (greater than or equal to sign)	=A1>=B1	Cell A1 is greater than or equal to cell B1
<= (less than or equal to sign)	=A1<=B1	Cell A1 is less than or equal to cell B1
<> (not equal to sign)	= A1< >B1	Cell A1 is not equal to cell B1

Reference Operator	***Example***	***Meaning***
: (colon)	=SUM(B5:B15)	**Range operator**, which produces one reference to all the cells between two references, including the two references.
, (comma)	=SUM(B5:B15,D5:D15)	**Union operator**, which combines multiple references into one reference.
(space)	=SUM(B7:D7 C6:C8)	**Intersection operator**, which produces a reference to cells common to the two references.

@ (at)	=@A1:A10 =SUM(Table1[@[January]:[December]])	**Reference operator**, which is used to indicate implicit intersection in a formula.

15. **Order of Operations.** Excel calculates formulas based on the following order of operations:

(a) Operations enclosed in parentheses.

(b) Exponential calculations (3^2, for example).

(c) Multiplication and division, whichever comes first.

(d) Addition and subtraction, whichever comes first.

Formulas

17. A formula in Excel is an expression that returns a specific result. For example: =2+3, which returns 5 as an answer. ***Note that all formulas in Excel must begin with an equal to sign (=).*** All formulas in Excel return a result, even when the result is an *error*.

18. Working in Excel, you will hear the words "formula" and "function" used frequently, sometimes interchangeably. They are closely related, but not exactly the same. Technically, a formula is an expression that begins with an equal sign (=). A function, on the other hand, is a formula with a special name and purpose. In most cases, functions have names that reflect their intended use. For example, you probably know the SUM function already, which returns the sum of given references.

Handy to Know…

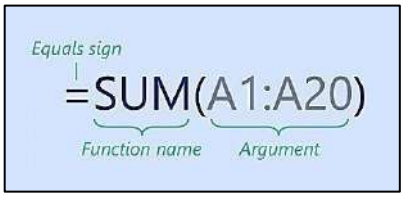
• ***Display Formulas in a Worksheet.*** If you want to display all the formulas in your current worksheet, the easiest way to do this is through the keyboard combination ***CTRL + ` (grave accent key)***. To hide the formulas again, simply repeat the same key combination.

Functions

19. Functions are pre-programmed formulas already provided in Excel, which can perform calculations covering a wide range of categories including math, financial, statistics, date and time arithmetic, financial calculations, lists, engineering, and more.

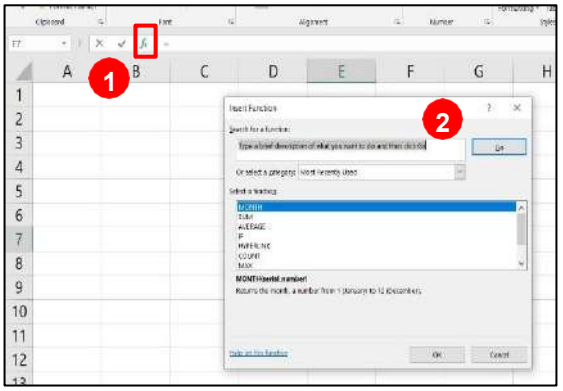
• Just like normal formulas that you create, functions must start with an equal sign. The equal sign is then followed by the name of the function (usually a descriptive name which indicates the purpose of the function).

• Most functions also require additional information known as **arguments,** which are supplied to the function in brackets after the function name.



- Functions are therefore written as "**=name of the function (arguments)**". For example, if you want to add all of the values in the cells from A1 to A20 you would write this function as **=SUM(A1:A20)**.

20. **Inserting a Function**. If you are familiar with the function that you need, you can type it into a cell the same way you type any other formula. If you are not sure if Excel has a function, or you cannot quite remember how it is written, you can use the Insert Function Tool ***fx*** on the **Formula Bar** to assist you. When you click on this tool the **Insert Function dialog box** will be presented to you which lists the most recently used or common functions and also allows you to search for other functions that you might need. The Insert Function dialog box will also type the function out for you and then provide you with a further dialog box to guide you through the process of specifying the arguments that the function needs to perform its calculation.



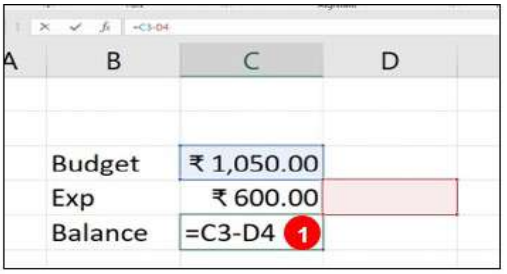
21. **Editing a Function**. Sometimes we may want to modify an existing formula. In the example below, we have entered an incorrect cell address in our formula, so we will need to correct it.

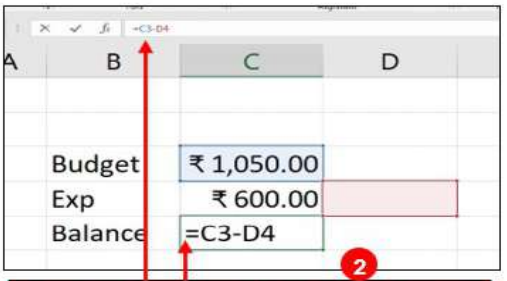
1. Select the cell containing the formula you want to edit. In our example, we'll select cell C5.

2. Click the formula bar to edit the formula. You can also double-click the cell to view and edit the formula directly within the cell.

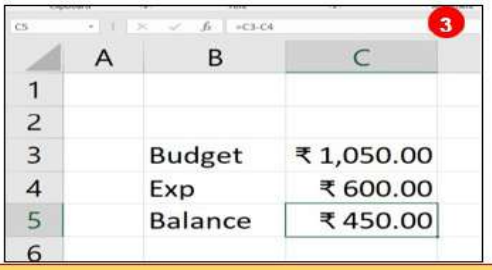
3. A border will appear around any referenced cells. In our example, we'll change the second part of the formula to reference cell C4 instead of cell D4.

When you're finished, press Enter on your keyboard or click the checkmark in the formula bar. The formula will be updated, and the new value will be displayed in the cell.





To edit a formula, double-click on the cell OR click the formula bar

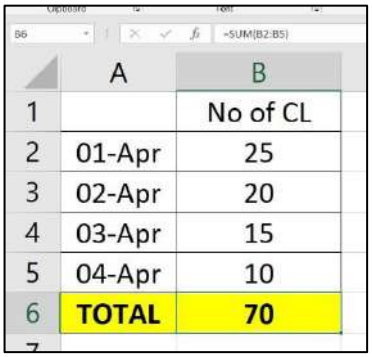


Handy to Know…

• If you change your mind, you can ***press the Esc key*** on your keyboard to avoid accidentally making changes to your formula.

Basic Functions

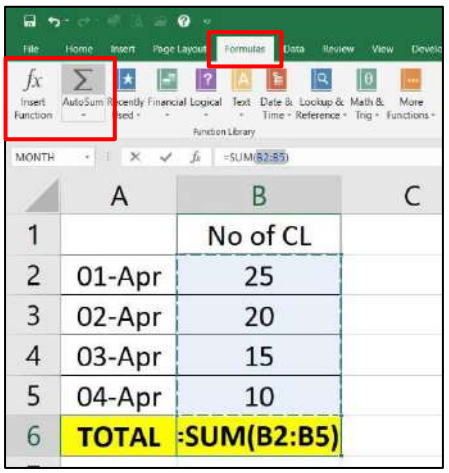
22. **SUM**. One of the most used functions is the **SUM** function. This function allows you to add the values in a range of cells. The function is written as ***=SUM (range or ranges to add)***. You can type the function, and then use the pointing technique to fill in the arguments. You can add individual values, cell references or ranges or a mix of all three. For example; ***=SUM (A2:A10)*** adds the values in cells A2:10, ***=SUM (A2:A10, C2:C10)*** adds the values in cells A2:10 and cells C2:C10.



23. **AutoSum**.

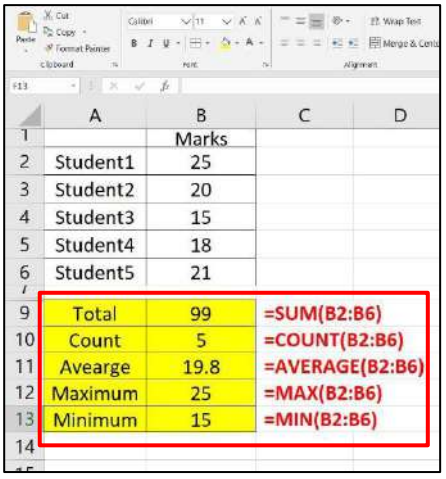
- Use the AutoSum shortcut located on the Home tab of the ribbon to complete the formula without having to type. The "Auto" part of the name AutoSum refers to the method automatically selecting what it believes is the range of cells to be summed by the function. The selected range is shaded and surrounded by an animated border known as marching ants.

- The AutoSum function should be input at the bottom of a column of data or the right end of a row of data. If you put the AutoSum function in another spot on the spreadsheet, the range of cells selected as the function's argument may be incorrect. To change the selected range, use the mouse pointer to highlight the correct range before pressing the Enter key to complete the function.



- Click the cell (B6) where you want the result to display and click the AutoSum icon on the ribbon, under Formulas Tab. Check to see that the selected range, which will form the function's argument, is correct. If it's accurate, press the Enter key on the keyboard to complete the function. The answer will display in the cell. When you click on the cell containing the solution, the completed SUM function appears in the formula bar above the worksheet.

24. **AVERAGE**. The **AVERAGE** function allows you to average the values in a range of cells. It is written the same way as the SUM function, for example, the average marks (19.8) of five students in our example can be obtained using function ***=AVERAGE (B2:B6)***.

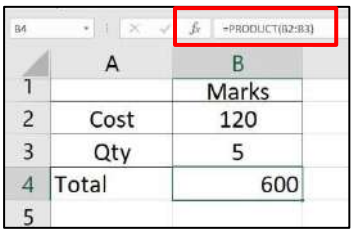


25. **COUNT**. The **COUNT** function counts the number of cells that contain numbers and counts numbers within the list of arguments. We can use the COUNT function to get the number of entries in a number field that is in a range or array of numbers. In our example, you can enter the formula to count the numbers in the range B2 to B6; ***=COUNT (B2:B6)*** returning a result of 5.

26. **MAX**. The **MAX** function returns the largest numeric value in a range of values. The MAX function ignores empty cells, the logical values TRUE and FALSE, and text values. In our example, the formula ***=MAX (B2:B6)*** returns the maximum marks scored i.e 25.

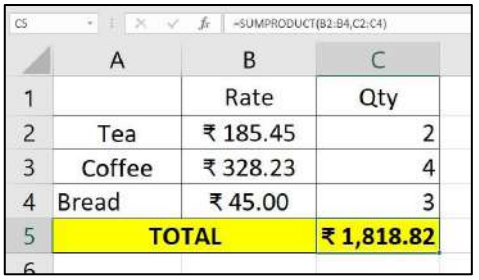
27. **MIN**. The **MIN** function returns the smallest numeric value in a range of values. The MIN function ignores empty cells, the logical values TRUE and FALSE, and text values. In our example, the formula ***=MIN (B2:B6)*** returns the minimum marks scored i.e 15.

28. **Product**. The **Product** function multiplies all the numbers given as arguments and returns the product. For example, if cells A1 and A2 contain numbers, you can use the formula ***=PRODUCT(A1, A2)*** to multiply those two numbers together. You can also perform the same operation by using the multiply (*) mathematical operator; for example, ***=A1*A2***. The Product function is useful when you need to multiply many cells together. For example, the formula ***=PRODUCT (A1:A3, C1:C3)*** is equivalent to =A1*A2*A3*C1*C2*C3.



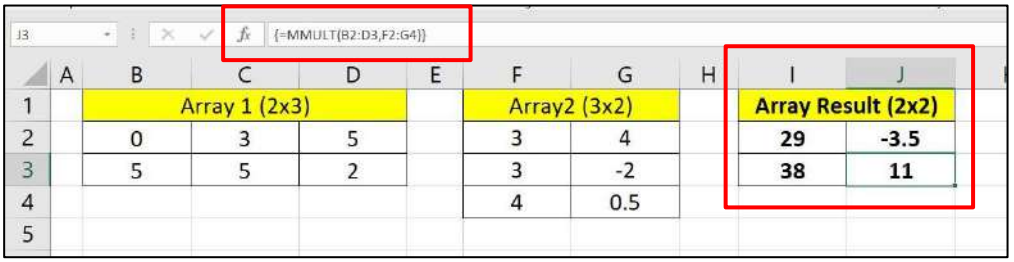
29. **SUMPRODUCT**. The **SUMPRODUCT** function returns the sum of the products of corresponding ranges or arrays. The default operation is multiplication, but addition, subtraction, and division are also possible.

- **Syntax**. =SUMPRODUCT(array1, [array2], [array3], ...)
- The array arguments must have the same dimensions. If they do not, SUMPRODUCT returns the #VALUE! error value. For example, ***=SUMPRODUCT(C2:C10, D2:D5)*** will return an error since the ranges aren't the same size.
- The SUMPRODUCT function works with arrays, but it doesn't require the normal array syntax (Ctrl+Shift+Enter) to be executed. The purpose of the SUMPRODUCT function is to multiply, then sum, the given arrays. If only one array is supplied, SUMPRODUCT will simply sum the items in the array. Up to 30 arrays can be supplied.
- In our example here, type the formula in formula bar as ***=SUMPRODUCT(B2:B4, C2:C4)*** and press Enter. Each cell in column B is multiplied by its corresponding cell in the same row in column C, and the results are added up [(185*2)+(328*4)+(45*3)] and the total bill amount is returned as Rs. 1,818.82.



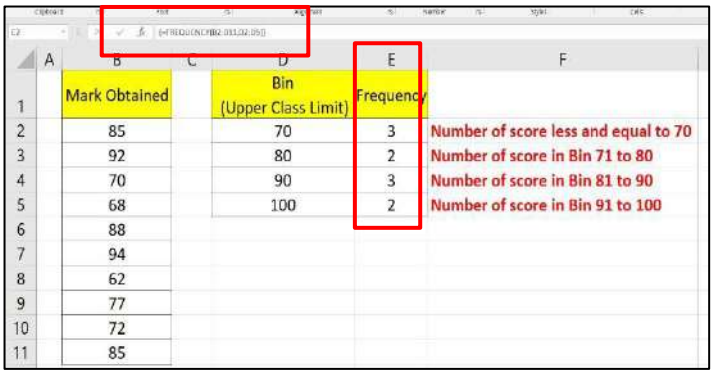
30. **MMULT**. The MMULT function returns the matrix product of two arrays. The result is an array with the same number of rows as array1 and the same number of columns as array2. For example, you can multiply a 4 x 2 array by a 2 x 2 array to return a 4 x 2 array result. **The formula must be entered as an array formula by first selecting the output range, entering the formula in the top-left-cell of the output range, and then pressing CTRL+SHIFT+ENTER to confirm it. Excel inserts curly brackets at the beginning and end of the formula for you.**

- Syntax =MMULT (array1, array2); array1 - The first array to multiply and array2 - The second array to multiply.
- Arrays must contain only numbers.
- Columns in array1 must equal the rows in array2.
- Array1 and Array2 can be provided as cell ranges, array constants, or references.
- MMULT returns the #VALUE! error if any cells in array1 and array2 are not numbers, or if array1 columns do not equal array2 rows.
- In our example below; we are multiplying a 2x3 matrix (array1) with a 3x2 matrix (array2). The resultant matrix will be a 2x2 matrix. For entering the MMULT function, we selected array I2:J3 and entered the function call as ***=MMULT(B2:D3, F2:G4)*** and ***pressed* CTRL+SHIFT+ENTER** to get the answer**.** Please note that the formula now will be surrounded by curly braces { }.



31. **FREQUENCY.** The **FREQUENCY** function calculates how often values occur within a range of values, and then returns a vertical array of numbers. For example, use FREQUENCY to count the number of test scores that fall within ranges of scores. Because FREQUENCY returns an array, it must be entered as an array formula. FREQUENCY ignores blank cells and text.

- **Syntax.** =FREQUENCY (data_array, bins_array)
- **Arguments.** *data_array* - An array of values for which you want to get frequencies; *bins_array* – An array of intervals ("bins") for grouping values.
- FREQUENCY always returns an array with one more item than the *bins_array*. This is by design, to catch any values greater than the largest interval in the *bins_array*.
- Each bin shows a count of values up to and including bin value, excluding values already accounted for.
- In our example; we are converting the marks obtained into a frequency distribution. Firstly, we have to define the upper-class limit of the Bins (in cells D2: D5) as <=70, 71 to 80, 81 to 90 and 91 to 100. To get the frequency distribution, we select cells E2:E5 and enter



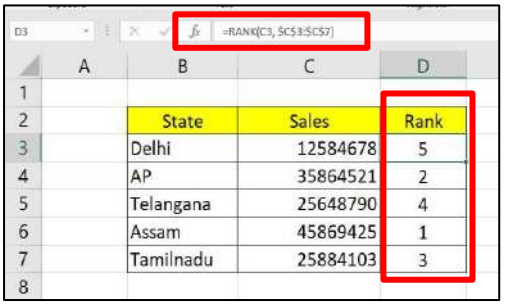
function as ***=FREQUENCY(B2:B11, D2:D5)*** and ***press*** **CTRL+SHIFT+ENTER** to get the answer**.** Please note that the formula now will be surrounded by curly braces { }.

Quick Tip…

Array formulas are powerful formulas that enable you to perform complex calculations that often can't be done with standard worksheet functions. They are also referred to as "Ctrl-Shift-Enter" or "CSE" formulas, because you need to press **Ctrl+Shift+Enter** to enter them. In **CDM parlance it is called Three Finger Salute**.

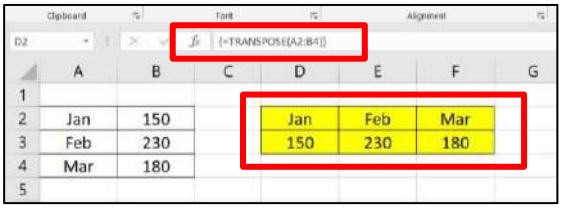
32. **RANK**. The Excel RANK function returns the rank of a numeric value when compared to a list of other numeric values. RANK can rank values from largest to smallest (i.e. top sales) as well as smallest to largest (i.e. fastest time) values, using an optional order argument.

- **Syntax**. =RANK (number, array, [order])
- **Arguments**. number - The number to rank; array - An array that contains the numbers to rank against; order - [optional] Whether to rank in ascending or descending order.
- The default for order is zero (0). If the order is 0 or omitted, the number is ranked against the numbers sorted in descending order: smaller numbers receive a higher rank value, and the largest value in a list will be ranked #1.
- If the order is 1, the number is ranked against the numbers sorted in ascending order: smaller numbers receive a lower rank value, and the smallest value in a list will be ranked #1.
- In the event of a tie (i.e. the list contains duplicates), RANK will use the lower rank value for each set of duplicates.
- In the example here, we have rank-ordered the sales on descending order.



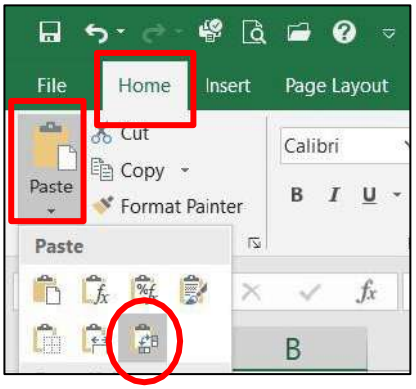
33. **TRANSPOSE**. The TRANSPOSE function flips the orientation of a given range or array. TRANSPOSE converts a vertical range to a horizontal range or a horizontal range to a vertical range. You must enter the TRANSPOSE function as an array formula. • **Syntax**. =TRANSPOSE (array)

- Arguments. array - The array or range of cells to transpose.
- When an array is transposed, the first row of the array is used as the first column of the new array, the second row of the array is used as the second column of the new array, the third row of the array is used as the third column of the new array, and so on.
- You must enter the TRANSPOSE function as an array formula that contains the same number of cells as an array, using **Control + Shift + Enter**.



- The new array must occupy the same number of rows as the source array has columns, and the same number of columns as the source array has rows.

- For a one-off conversion, you can use paste special (> transpose) facility. Start by selecting and copying your entire data range. Click on a new location in your sheet, then go to Home > Paste > Transpose (T) icon, as shown in Figure. Click and Excel will transpose the column and row labels and data.

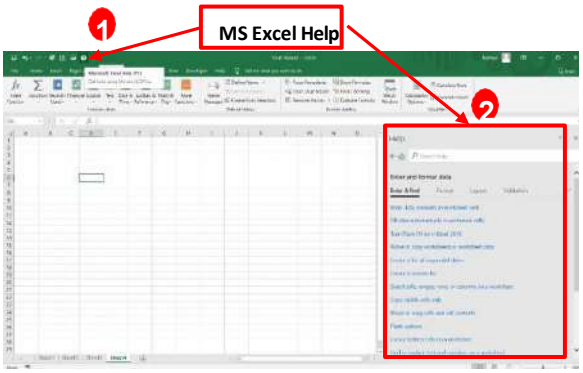


Getting Help

34. You can use the Excel Help system to get assistance on any topic or task. While some information is installed with Excel on your computer, most of the information resides online and is more up-to-date. You need an Internet connection to access resources from Office.com. To get help:

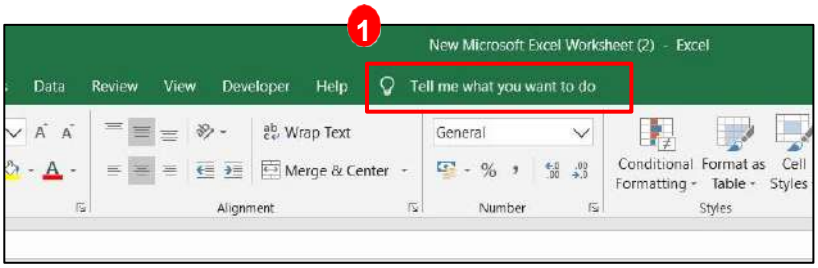
- Click the Microsoft Excel Help button on the Title bar. The Excel Help window opens, displaying general help topics.

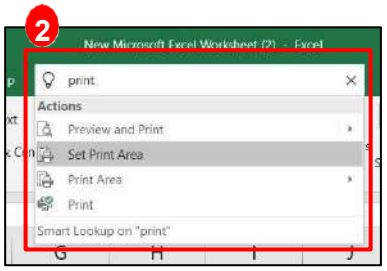
- Click any link to display the corresponding information. To navigate between help topics, click the Back button, Forward button, or Home button on the toolbar. To print a help topic, click the Print button on the toolbar.



- To search for a specific topic, type one or more keywords in the Search box, and then press the Enter key to display the search results.

- One of the niftiest new features is the Tell Me help feature available from the ***Tell me what you want to do*** text box located to the immediate right of the last command tab above the Excel ribbon. As you enter a help topic into this text box, Excel displays a list of related Excel commands in a drop-down list. When you select one of the items displayed on this list, Excel either selects the associated Ribbon command (no matter which Ribbon tab is currently selected) and waits for you to make a selection from the command's submenu or, in some cases, just goes ahead and completes the associated command sequence for you.



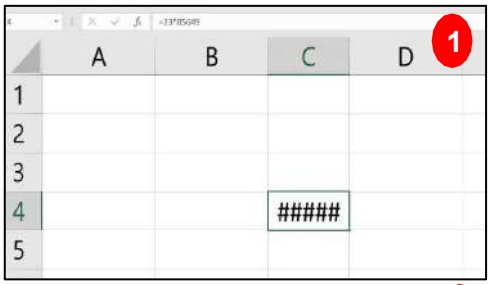


Common ERROR Messages

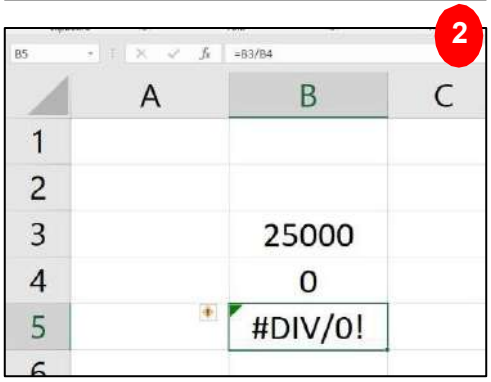
35. Microsoft Excel has some in-built messages that can assist you when something goes wrong with a formula. These messages appear in the cell that contains the formula, and sometimes also other

formula cells that depend upon it. **The messages are always prefixed with a hash sign (#) and appear with a code**. The more common error messages are listed below.

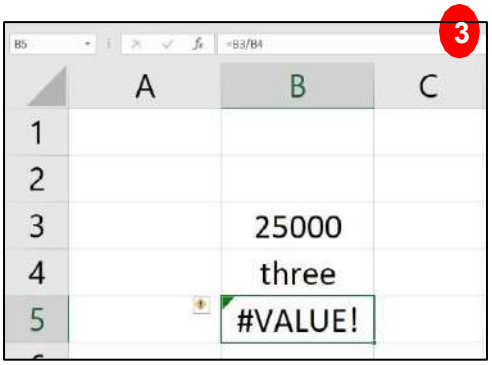
Line of Hash (#####) - Sometimes referred to as "tramlines", a line of hash signs usually occurs because a column is not wide enough to display the numbers in the cell or formula. **Widening the column will correct this problem** – you can drag the column heading until the value in the cell appears as it should.



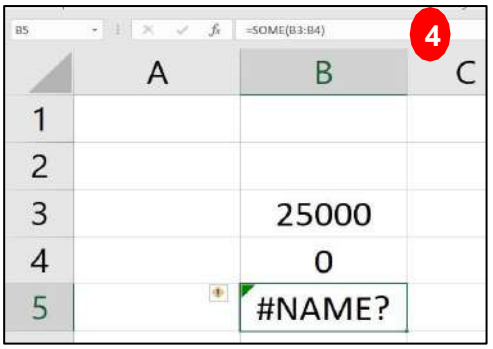
#DIV/0! error - This message means you are trying to divide a value by zero – this is mathematically impossible. In the example at the right we are trying to divide 25000 by 0. **To prevent the error, you will need to enter a value greater than zero into cell B4, the divisor cell**.



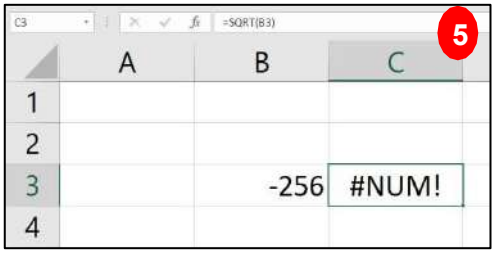
#VALUE! error - In this message Excel is advising that something in the formula is not a value and therefore a calculation can't be made. A close examination of the example at the right shows cell B4 contains the word "three". Therefore, the formula in cell B5 is trying to divide 25000 (in cell B3) with a word, which doesn't make sense.



#NAME? error - This message appears when text is found in a formula that cannot be matched to either a legitimate function or range name. In the example to the right, the formula has been entered as **=SOME(B3:B7)** – there is no such function as **SOME**, and presumably the correct one should have typed **=SUM(B3:B7).**



#NUM! error - The #NUM! error occurs when a number is too large or small, or when a calculation is impossible.



#N/A error - This error appears when something can't be found. Often, #N/A errors are caused by extra space characters, misspellings, or an incomplete lookup table.

Some Useful SHORTCUTS

Ctrl + A	Select all contents of a worksheet
Ctrl + B	Bold highlighted selection
Ctrl + I	Italicize highlighted selection
Ctrl + C	Copy selected text
Ctrl + V	Paste
Ctrl + D	Fill
Ctrl + K	Insert link
Ctrl + F	Open find and replace options
Ctrl + G	Open go-to options
Ctrl + H	Open find and replace options
Ctrl + U	Underline highlighted selection
Ctrl + Y	Underline selected text
Ctrl + 5	Strikethrough highlighted selection
Ctrl + O	Open option
Ctrl + N	Open new document
Ctrl + P	Open print dialog box
Ctrl + S	Save
Ctrl + Z	Undo the last action
Ctrl + g	Move to next section of text
Ctrl + W	Close document
Ctrl + F6	Switch between open workbooks/windows
Ctrl + F9	Minimize current window
Ctrl + F10	Maximize currently selected window
Ctrl + Page Down	Move between Excel worksheets in the same document

Ctrl + Page Up	Move between Excel worksheets in the same document
Ctrl + Tab	Move between two or more open Excel files
Alt + =	Create a formula to sum all of the above cells
Ctrl + ‘	Insert the value of the above cell into the current cell
Ctrl + Shift + !	Format number in comma format
Ctrl + Shift + $	Format number in currency format
Ctrl + Shift + #	Format number in date format
Ctrl + Shift + %	Format number in percentage format
Ctrl + Shift + @	Format number in time format
Ctrl + Space	Select entire column
Shift + Space	Select entire row
F2	Edit the selected cell
F5	Go to a specific cell
F7	Spell check selected text and/or document
F11	Create a chart
Alt + Shift + F1	Insert new worksheet
Alt + H	Go to Home Tab
Shift + F3	Open the Excel formula window
Shift + F5	Bring up search box (Find & Replace)

Self-Explore ….

1. Get acquainted with the MS Excel interface and features.
2. Get familiarised with all the functions discussed in this handout.
3. Get familiarised with Excel shortcuts for fast operations using keyboard.
4. Explore other functions and its operations.

References:-

1. https://templates.office.com/en-us/Welcome-to-Excel-TM10000137

2. https://support.office.com/en-us/article/excel-for-windows-training-9bc05390-e94c-46af-a5b3d7c22f6990bb

3. https://www.youtube.com/watch?v=rwbho0CgEAE

4. https://www.youtube.com/watch?v=RdTozKPY_OQ

Self-Assessment Exercise

Create a 10x10 multiplication tables and find the basic calculations covered in this handout. You can only type into the four yellow cells. Use the mouse only for other cells. ***No cut copy paste allowed !!*** (Hint: Range is difference between Max and Min)

1	2								
2	4								
Total									
Average									
Max									
Min									
Range									

Answer :

	1	2	3	4	5	6	7	8	9	10
	2	4	6	8	10	12	14	16	18	20
	3	6	9	12	15	18	21	24	27	30
	4	8	12	16	20	24	28	32	36	40
	5	10	15	20	25	30	35	40	45	50
	6	12	18	24	30	36	42	48	54	60
	7	14	21	28	35	42	49	56	63	70
	8	16	24	32	40	48	56	64	72	80
	9	18	27	36	45	54	63	72	81	90
	10	20	30	40	50	60	70	80	90	100
SUM		110	165	220	275	330	385	440	495	550
AVERAGE		11	16.5	22	27.5	33	38.5	44	49.5	55
MIN		2	3	4	5	6	7	8	9	10
MAX		20	30	40	50	60	70	80	90	100
RANGE		18	27	36	45	54	63	72	81	90