MICROSOFT EXCEL TUTORIAL

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MICROSOFT EXCEL.

This is application software classified as a spreadsheet. It is used to perform analysis on numerical data e.g. using formulas and functions to perform calculations, drawing charts etc.
Excel which is a spreadsheet program can also be referred to as an application software used to *calculate*, *organize* and *analyze* numerical *data*

Other types of spreadsheets programs include
Corel Quattro Pro, Multi plan, Ms. Excel, OpenOffice Calc, iWork numbers, google sheets (cloud solution), VisiCalc – The first spreadsheet program to be developed
Lotus 1, 2, 3- has been discontinued

Sage and *quick books* are examples of financial accounting software
FreshBooks is a cloud accounting software.

Spreadsheets can be grouped into two
i) Manual Spreadsheets – these are paper spreadsheets which are divided into rows and columns e.g. ledger book.
ii) Electronic Spreadsheet - program that people use for storing, organizing and manipulating data.

Benefits/Advantages of Spreadsheets. (Merits over Manual Spreadsheets)

- Data can easily be moved, copied and deleted without messy erasures
- Program is able to arrange or sort data correctly compared to manual spreadsheets
- It has the ability to perform automatic recalculations.
- Entries made are faster, neat and accurate
- It has template facility that are used as a basis for other similar workbooks
- Have inbuilt functions that enable the user to quickly manipulate mathematical data

Demerits of Spreadsheets.

- When a sheet is too long, it is not possible to view it at a glance on the screen
- If a wrong formula is entered, it leads to incorrect results
- A mistake in any value will affect the whole sheet

Components of Spreadsheets

- Worksheet: consists of rows and columns (*cells)* where data values are entered, a group of worksheets make up a workbook
- Graphs: these are pictorial representations of the base data (*data range*) on a worksheet
- Database functionality: Most spreadsheets have database functionality such as filtering, validation and sorting Features from database management systems incorporated into excel in the data tab e.g. *pivot*, *query*

Running/Launching/Starting Excel.

-Click start button
-Click all programs, Under Ms. Office
-Click Microsoft excel

The working area in excel is divided into ***rows*** (are numbered numerically) and ***columns*** (are labeled alphabetically. The intersection between a row and a column is called a ***cell*** and it's in these cells that we enter data. Every cell is given a name/address or ***reference***. Cells make > *worksheets* found in a > *workbook*.

(Discuss Excel Interface: Ribbons, Formula Bar, cell pointer, Name box, Worksheet Tabs, status bar)

Moving through the worksheet

You can use the arrow keys/navigation keys and the mouse to move around the worksheet.

***Arrow keys*:** we use this to move towards the direction of the arrow one cell at a time e.g. up, Down, left and right.
Mouse*:* Click on any to move to it

Highlight/Selecting cells

- You can always ***drag*** to select a range of cells e.g. A2 up to A10
- *CTRL + Shift + 8*
  Highlights a range of cells/current region
- ✓ Press *Shift + 1st cell + last cell* is also used to select a range of cells

N.B: To select a whole column
CTRL + spacebar while to select an entire row, click over any cell on the row and hit *Shift + Spacebar*

Selecting Non-Contiguous ranges

If you need to select cell that are not contiguous (i.e., *ranges that are not necessarily next to each other*), proceed as follows.

- ✓ Select the first area of cells
- ✓ Hold down the Ctrl key while selecting the other areas.

Cell Data Types/Data entry

There are three main categories of data that you can enter in your worksheet

Labels e.g. Name.
Values e.g.20.
Formula e.g. =A5 +A6 + A7 + A8
Function e.g. =Sum (A5:A8)

All functions are made up of three components
The =**sign** indicates that the characters that follow are a function.
The **function name** is the name of the function to be executed e.g. SUM
The **argument** identifies the data to be used by the function and is always enclosed in parentheses e.g. (D4:D6)

Application Areas of Spreadsheets

- Accounting: used in maintaining important information such as sales, expenses e.tc
- Scientific Applications: scientists store empirical data and complex mathematical models
- Banking: calculating rates, loans and future expenditure
- Home/Personal use: e.g. budgeting
- Data management: e.g. use of tools like Forms, filtering and sorting
- Forecasting (what if analysis) – used for predicting economic trends, budgeting, stock control

CALCULATIONS

The power of excel is the ability to use ***Formulas*** and ***Function*** to perform on numeric values.
Some of the calculations performed on numeric data include the following:
When entering a formula or function you must start with the sign [=]
For example, to perform calculations on values in cells A5 to A8 enter the following formulas and functions

a) Additions-To add values in a number of cells, place the cursor in the cell to contain the answer and enter a formula or function.
Formula: =A5+A6+A7+A8
Function: You use the **SUM** function
=SUM (A5:A8)

b) Multiplications – To multiply values in a number of cells, place the cursor in the cell to contain the answer and enter either a formula or function
Formula: =A5*A6*A7*A8
Function: You use the **PRODUCT** function
=PRODUCT (A5:A8)

c) Average – To get average of values in a number of cells, place the cursor in the cell to contain the answer and enter the following function
Formula: = (A5+A6+A7)/4
Function: =You use the **AVERAGE** function
=AVERAGE (A5:A8)

d) Maximum- The maximum function is used to get the highest value in a range of values
=MAX (A5:A8)

e) Minimum- The minimum function is used get the lowest value in a range of values
= MIN (A5:A8)

f) Subtraction- Use the formula to perform subtraction calculations among cells
=A5-A6-A7

g) Division – Use a formula to perform division calculations among cells
=A5/A6

Additional Examples of Inbuilt *Functions*

- Statistical functions include (AVERAGE, COUNT, COUNTIF, MODE, MIN, MEDIAN, RANK, STDEV)
- Logical functions include (IF, AND, OR, NOT)
- Mathematical functions (SUM, PRODUCT, ROUND, SUMIF)
- Financial functions (PMT, FV, NPV, RATE, PRICE)
- Date and time functions (TODAY, NOW, DATE) etc.

Mathematical/Arithmetic formula Operators	+, -, *, /, ( )
Relational/Logical Operators	=, >, <, >=, < >

(*Check Out Order of Execution*)
Parenthesis, percent, Exponents, Division, multiplication, Addition and Subtraction.

N.B: To use Auto-sum, just select the whole data and press **ALT + =**
We can also sum *single cell refs, ranges* or *constants* e.g. **=SUM(A10, B11:B15, 100)**

FORMATTING CELLS

To format cells simply highlight the cells and click on the button or command to perform the Needed format. You can use the formatting features in the *Styles group* in the *Home tab*
Some other formatting may include: font type, font size, bolding, borders etc.

Exercise 1
Create the spreadsheet below

	MATHS	ENG	BIO	CHEM	TOTAL	MINIMUM
JANE	45	60	54	78		
MARY	15	54	25	36		
SAM	78	55	63	57		
SARAH	47	87	65	32		
KIM	41	25	87	36		
LUKE	52	89	97	48		
TOTAL						
AVERAGE						
MINIMUM						

- Calculate the **total, average, and minimum** mark for each student.
- Calculate the **total, average** and **minimum** mark for each subject
- **Center** all column headings and their mark in the cells
- Change the **color** of the column and row headings to red and bold them
- Apply a bright green *highlight* color to all the data cells
- **Save** your work on the desktop using the name assignment 1

Formating numbers

Use the following steps to format numbers in excel

- Select the range of cells that contain numeric/values
- Launch the format cells dialog box from the *Number* group of the Home tab
- Under category Choose any number formats required e.g.
  - *General*: the values will have no specific format
  - *Number*: used for general display of numbers e.g. 875.5
  - *Currency*: for displaying monetary values e.g. $450
  - *Accounting*: lines up currency symbols and decimal points
  - *Date*: displays dates in chosen format
  - *Time*: displays time in chosen format
  - *Percentage*: multiplies values in a cell by 100 and displays it as %
  - *Text*: formats cells to be treated as text even when numbers are entered
  - *Custom*: number formats not predefined in Ms. Excel can be defined here

N.B:
To collapse or expand the Ribbon **CTRL + F1**

To toggle between formulas and values **CTRL + `** **OR** *Formula Tab > F. Auditing group > show formulas*
Practice **Conditional formatting** with **icons sets** found in the Home tab
(Also Check out use of ▲▼ from Arial font family under insert symbols by cell referencing and IF)

Alignment

In excel the are two alignment namely vertical and horizontal alignments. To align cells entries, do the following

- Make sure the cells are highlighted
- In the HOME tab
- Under Alignment group
- Set as desired

Borders

You can add borders to select cells. To do the following steps below

- select the cells
- Click the HOME tab
- Click on borders
- Select a border line style from the list
- Select a border color
- Click on the outline/inside to add the needed borders
- Click OK

Merging cells

- Select the cells to be merged
- In the HOME tab
- Under alignment group
- Click merge and center

The Auto fill Handle

-This is a small handle used to automatically fill a range of cell with data. The handle is found at the bottom right corner of the cell pointer. You can also use it to copy a formula from one cell to the other to enable automatic calculations in those cells. To use the auto fill handle move the cell pointer to it until it changes to a small black cross, hold down the mouse and drag.

Re-naming our worksheet.

-An excel workbook is made up of worksheets and every worksheet has a unique name e.g. Sheet 1

At any given time, you can change the name of the sheet

>Double click on its sheet tab then type the new name

>Right-click on a sheet, choose rename and type the name

Adding and removing worksheet parts

1 To insert a column/row: Position the pointer where the new column/row should appear, on the Home tab ribbon, in the cells Group click Insert

2. To insert a cell

-Click on insert then cells and then indicate the direction of cells and click OK

Inserting/Deleting a worksheet

To insert one or more worksheets

- On the Home tab ribbon in the Cells group click Insert
- On the dropdown list select *Insert sheet*

N.B: You can also Delete a worksheet by right clicking the sheet tab then click the delete option on the shortcut menu

Copying and pasting

- ✓ Select the data to be copied
- ✓ Click on Home Tab
- ✓ In the Clipboard Group click COPY
- ✓ Click on the first destination cell
- ✓ Go back to the Home Tab and Click Paste

Moving data/Cut

- ✓ Select the data to be moved
- ✓ Click on Home Tab
- ✓ In the Clipboard Group click CUT
- ✓ Click on the first destination cell
- ✓ Go back to the Home Tab and Click Paste

Copy shortcut is CTRL + C, Moving CTRL + X, Pasting is CTRL + V
(Check out Auto format feature)

IF STATEMENTS.

-These are statements that are used to condition the computer to perform an action e.g. a calculation based on a certain condition. The statement must bear two possible actions that the computer must undertake on the basis of the condition given. The syntax for writing an IF statement is as follows

=IF (CONDITION, TRUE/FALSE)

-As they are used in calculations, IF statements must begin with an EQUAL sign followed by the if statement then give the condition, all the elements in an if statement must be separated by commas

Example:

If students had done an examination and they are to be graded so that those with 50 marks and above get a PASS and those with below 50 marks get a FAIL then the following IF statements will be written to do the grading

=IF (A5>=50, "PASS", "FAIL") OR =IF (A5<50, "FAIL", "PASS")

Example:

If you are awarding money according to the sex of the person so that a MALE gets 1500 and the female gets 1800, you will write the following statements

=IF (A5= "MALE", 1500, 1800) OR =IF (A5= "FEMALE", 1800, 1500)

-You can also have the computer perform a calculation on values based on the condition that you give.

Example: If you are to calculate the tax on gross pay where a male pays 10% of the gross pay while a female pays 8% of her gross pay then you would write the following IF statement

=IF (A5= "MALE", 10%*B5, 8%*B5) OR =IF (A5= "FEMALE", 8%*B5, 10%*B5)

Where A5 is the cell with the sex status and B5 is the cell containing the gross pay amount

Nested IF

Syntax =IF(CONDITION, TRUE, IF(CONDITION, TRUE, IF(CONDITION, TRUE, FALSE)))

Example =IF(A5>100, "PASSED", IF(A5>50, "AVERAGE", "FAILED"))

EXERCISE 2

EMPLOYEE	SEX	BASIC PAY	HOUSE ALL	NHIF	GROSS PAY	NET PAY
JOYCE	F	23900				
PAT	F	12870				
CHARLLY	M	15450				
CHRIS	M	23900				
MORRIS	M	11000				
TERRY	F	8900				
BOB	M	17650				

CALCULATE:

House allowance

-Males get 15% of their Basic pay while females get 10% as their house allowances

NHIF

-Those earning a basic pay of over 1500 pay 7% while the rest pay 6.2%

=IF (C2>1500, 7%*C2, 6.2%*C2)

Gross pay

=Basic pay + House Allowance

NET PAY

=Gross pay - NHIF

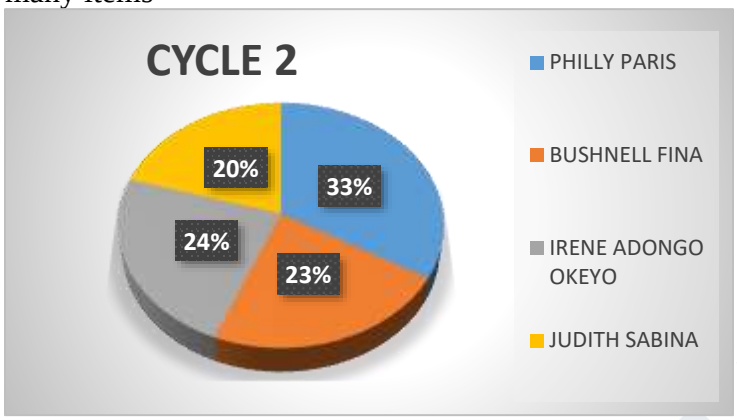
CHARTS/GRAPHS.

Charts are drawn to represent any given numeric data in graphical form. You can draw a chart to the trend of a certain details. Types include line chart, bar chart, XY (scatter) chart, Column chart etc.
Features of a Chart Titles, Labels, Data ranges and a Legend (shows specific information that are on the chart)

To draw a chart, follow the steps below/Use the Chart wizard.

- ✓ Highlight the data including the rows and columns
- ✓ Click INSERT tab then select charts
- ✓ Select the type of chart you want to draw e.g. Column, Bar etc.
- ✓ Set the various desired chart options like *legends, labels, chart title, axes* then OK

N.B: For pie charts you can only draw a pie chart for one item against many items and not many items against many items



N.B: After selecting your data range (full)
If you press F11, A chart will be created for you automatically

check out ***sparklines*** select a row a choose any e.g. line, win/loss, column

DATA MANAGEMENT.

1. Sorting

-This involves arranging data in an organized manner i.e. in ascending or descending order
-select the data to be sorted then click Data tab, in the sort and filter group
-click sort, define whether Ascending (A-Z) or Descending (Z-A)

2. Filtering

Filtering is a quick and easy way of finding and working with a subset of related worksheet.
A filtered worksheet list will only display the rows that meet the condition or criteria you specify. Most excel versions have two commands for filtering

- The Auto filter: it uses a simple criteria and includes filter by selection
- Advance filter: it uses more complex criteria

Procedure:

- Click a cell in the list that is to be filtered, usually the list is in a column
- On the DATA ribbon in the *sort & filter* group click the filter button

Note: The blank and blanks options are available only if the column you want to filter contains a blank cell

ii. Advanced filters

-This is where you use an empty area in your worksheet to perform the filter process. Your worksheet should have at least three blank rows that can be used as a criteria range above the list range. The list must have a column labels.

a) Criteria range: This refers to a cell range that contains a set of search conditions you can use with advanced filter command. It consists of one row of criteria labels (headings) and at least one row that defines the search conditions

b) List range: It is a series of work sheet rows that contain related data from which you are filtering records. The first list range has labels (headings) for the columns

3. FORMS.

Are used for data input

In the Quick access toolbar, you can add a form command

Subtotals and grand totals

Sort the data in ascending/descending order

- ✓ Click a cell in the list, then on the DATA ribbon in the outline group click subtotal button
- ✓ The subtotal dialog box pops up, in the *at each change* in dropdown list, select the field to use for grouping
- ✓ In the *use function* dropdown list, select a function you want to use to create subtotals
- ✓ In the *Add subtotal* to box, select the columns that contains values you want to subtotal…finally click OK

Input validation

- ✓ Highlight the range of cells to validate
- ✓ On the DATA tab in the data tools group, click validation button
- ✓ Click settings tab and set the criteria e.g. whole numbers

EXAMPLE 3.

Create the spreadsheet below and answer the questions that follow

NAME	SEX	TOWN	TRADE	INCOME
JOHN	M	KISUMU	HAWKER	16000
MARY	F	NAIROBI	SECRETARY	24800
JACK	M	NAIROBI	DRIVER	17900
JANE	F	MOMBASA	HOTELIER	67960
MARK	M	KISUMU	DRIVER	20000
JACOB	M	MOMBASA	HAWKER	19876
MILLY	F	KISUMU	HOTELIER	48790
THOMAS	M	NAIROBI	MANAGER	58740

1) Sort the list in descending order of their names, then by their sex and by their income.
2) Using the auto filter feature filter all the records of all the people with income of above 45000/=
3) Filter only those records with Kisumu residents
4) Create a filter of the people earning an income of between 10000 and 20000
5) Save your work using the name Assignment

REFERENCES.

-These are used to identify a cell or a range of cells on a work sheet and tell excel where to look for the values or data to be used in a formula. References make it simpler to perform calculations by copying formulas from one cell to another thereby saving the time of having to repeat the same formula now and again.

-There are types of references namely

a) Relative references: This is used to tell excel how to find other values to use in a formula by starting from the current cell. In this reference all the values in a formula will change as you copy the formula using the auto fill handle and as you move away from the current cells e.g. **C10*E6**

b) Absolute references: This is where by some values in the formula will remain the same even as the formula is copied from cell to cell. That means that some values are going to be referred to wherever the formula is copied. When entering a formula with absolute references, the cells with those values that do not change are locked using a dollar sign ($).For example if cell A5 contains a value that is to be used a formula in many cells, it will be typed as $A$5

C) Mixed cell reference: example =$D$10 * E6

Practical.

Saving and Printing a worksheet/workbook

EXTRA WORK

- Practice data validation

  Select the range > click Data tab > click Validation

- Possible Error Messages

  e.g. ######, #NUM (Discussed under advance pages)

- Function **RANK**

  e.g. 34, 55, 77, 23

  If 77 is in cell A3 then =*RANK(A3, A1:A4)* would return 1

  =*RANK(A3, A1:A4,1)* would return 4

- Function **SQRT**

  =*SQRT(C10)*

  If C10 content is 25, then the function will return 5

- To Hide Grid lines View tab > show group > uncheck gridlines

- **Contextual tabs**

  There are some tabs that appear in the ribbon only when you work on specific tasks.
  For example, when you create a chart, a Chart Tools section appears with two new Tabs

ADVANCED EXCEL

1. MATH & TRIGONOMETRY FUNCTIONS

✓ ***Sum If***

	B	C
7	Red	3
8	Blue	5
9	Black	2
10	blue	10

=sumif(B7:B10, "Blue", C7:C10) Returns 15

=sumif(B7:B10, "< >Blue", C7:C10) Returns 5

✓ ***SumIfs***

Month	Profits	Quarter
Jan	5,000	Q1
Feb	6000	Q1
March	1000	Q1
April	7000	Q2
May	9000	Q2

Find the sum of all Profits made in the 1st Quarter???
=sumifs(B2:B6, C2:C6, "=Q1") Will return 12,000/=

✓ ***Modulus***

=MOD(3,2) Returns 1
=MOD(20,4) Returns 0

N:B

If you use Quotient it returns the integer portion
=**QUOTIENT**(20,4) Returns 5

✓ ***SumSQ***

3, 10 =SUMSQ(A1,B1) Returns 109
2, 5 Returns 29

✓ ***Round***

=round(B6, 3) If the value in B6 is 28.1569 then it will return 28.157
=round(B6, 2) If the value in B6 is 28.1569 then it will return 28.16

✓ ***Random***

In order to create a bunch of random numbers greater or equal to zero to 1 use
= Rand ( )
In order to create a bunch of random numbers greater or equal to zero to 50 use
= **Rand() * 50**

Or you can use = **RandBetween (20,70)**

✓ ***Base***

	Number	Base
2	110	2
3	50	8
4		
5	10	2
6		
7	X	
8	IVV	

=BASE(A2,B2) Returns 1101110
=BASE(A3,B3) Returns 62

=**LOG**(A5,B5) Returns 3.3219
=**LN**(A5) Returns 2.302
=**LOG10**(?) ?

=**ARABIC**(A7) Returns 10

✓ ***LCM*** **(***Returns the Least Common Multiple)*

	A	B
1	2	5
2	3	6
3	5	8
4	125	65

=LCM(A2,B2) Returns 10
=LCM(A3,B3) Returns 6

✓ ***GCD*** **(***Returns the Greatest Common Divisor)*
=GCD(A4,B4) Returns 5

✓ ***Factorial*** *(Returns the Factorial of a number, equal to 1*2*3*……..(no)*
=FACT(B2) Returns 720, 5! Is 120 3! Is 6

✓ **<u>TANGENTS AND RADIANS</u>**

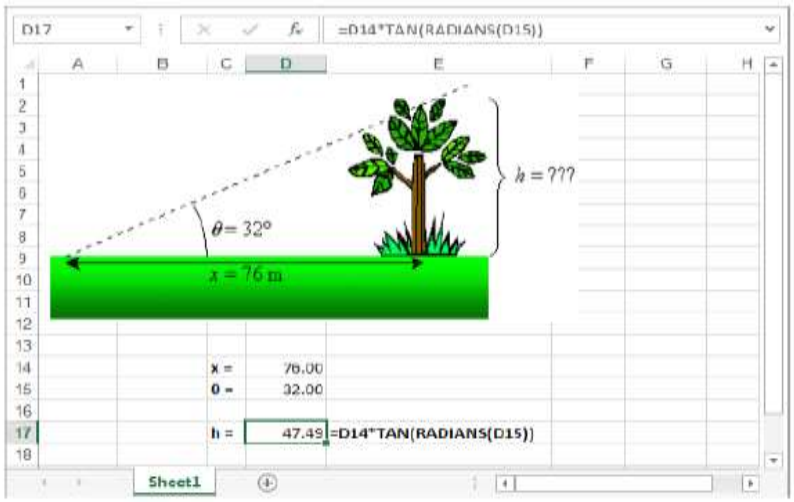


FIGURE 9-11
*You can solve this problem by using the trigonometric identity tan = h/x. You can rearrange this formula to find h (the height of the tree) so that h = x*tan. Be aware that Excel calculates the tangent using radians, which are a measure of an angle, like degrees. Fortunately, Excel provides a RADIANS() function, making it easy to convert degrees to radians. (You can do the reverse—convert radians to degrees—using Excel's DEGREES() function.) In this example, you use the RADIANS() function to convert degrees into radians, and then use the result of that calculation as the argument in the TAN() function.*

Hobbs is looking on top of a tree at an angle of 32^0 while the distance between him and the tree is 76 meters, Find the height of the tree?

Height = 76 * tan (radians (32))

2. ENGINEERING FUNCTIONS

	A	B
2	105	
3	50	

=Convert (cell, …. Choose unit, ……choose unit)
e.g.
=Convert (A2, inch, meters)

	A	B
1	5C	
2	111	
3	15	
	DATA	BASE
4	A	16

=HEX2DEC(A1) Returns 92
=BIN2DEC(A2) Returns 7
=DEC2BIN(A3) Returns 1111

OR

=DECIMAL(A4,B4) Returns 10

3. STATISTICAL FUNCTIONS

- ✓ ***Sumproduct***

	Quantity	***Price***	
2	3	2	
3	8	6	
4	1	5	
			=59

=SUMPRODUCT(A2:A4,B2:B4)

- ✓ ***Countif***

	B	C
7	Red	3
8	Blue	5
9	Black	2
10	blue	10

=countif(B7:B10, “B???”) Returns 2
=countif(B7:B10, “B*”) Retruns 3

- ✓ **Count** only counts VALUES but if you want to count TEXT use **COUNTA**
- ✓ **COUNTBLANK**() function takes a single argument—a range of cells—and gives you the number of empty cells in that range

✓ **Large(range, position)**

For example, if you specify a position of 1 with the LARGE() function, you get the largest item on the list, which is the same result as using MAX(). If you specify a position of 2, as in the following formula, you get the second-largest value:

=LARGE(A2:A12, 2)

Here's an example formula that adds the three largest entries in a range:

=LARGE(A2:A12,1) + LARGE(A2:A12,2) + LARGE(A2:A12,3)

Assuming the range A2:A12 contains a list of monthly expenses, this formula gives you the total of your three most extravagant splurges.

✓ **Small()**

performs the opposite task by identifying the number that's the smallest, second-smallest, and so on. For example, the following formula gives you the second-smallest number:

=SMALL(A2:A12, 2)

✓ **Frequency.**

it lets you define multiple ranges, and then, after chewing through a list of numbers, tells you how many values on the list fall into each range.

A	B	C	D	E	F
Names	**score**				**frequency**
WERE	88				3
KARDI	49	**Range**	**Upper limit**		2
PAUL	72	0-50	50		1
LAURA	57	51-80	80		
WENDY	34	81-100	100		
BROOKS	20				

The function **=FREQUENCY(B2:B7,D4:D6)**

The formula in cell F2 is an **ARRAY FORMULA**. For this formula to return values in cells F2, F3 and F4 you must open this workbook in the Excel desktop program (not the web browser). In Excel, select cells F2, F3 and F4, press *functional key* 2 to switch the status bar from EDIT mode to ENTER mode, and then press **CTRL + Shift + Enter**. Otherwise, only a value in cell F2 will be returned.

4. INFORMATION FUNCTIONS

=ISBLANK(D2)	Returns TRUE or FALSE if cell D2 is blank or having something inside it
=ISERR(D2)	Returns true for cells having errors and false for cells with no errors
=ISEVEN(D3)/ISODD	Returns true if the value of cell D3 is even/odd
=ISNUMBER(D4)	Returns TRUE if cell D4 contains a number
=ISTEXT(D5)	Returns TRUE if cell D5 contains text

5. LOGICAL FUNCTIONS

	A	B	C
1	200	0	4
2			8
3			

=**AND**(C1*C2=32) Returns TRUE
=**OR**(C1=4,C2=7) Returns TRUE

=**IFERROR**(A1/B1, "kunaerror")
N.B: If it finds NO ERROR it will return the results else it will display your message

	E	F
3	15	20
4	11000	7000

=**IF**(SUM(E3:F3)>18, "OLD,"YOUNG")

To check if cell E4 is more then 10,000 and also less then 90,000 at the same time without using two Ifs function i.e. 10,000 – 90,000

=**IF**(AND(E4>10000, E4<90000), "TRUE", "FALSE")

If value in cell A1 is not zero, multiplies A1 by the value in B10, otherwise displays blank text

=**IF**(A1< > 0, A1 * B10, " ")

6. TEXT FUNCTIONS

	B	C
10	Jesse	Lingard
11	19	69

=concatenate(B10, " ",C10) Returns Jesse Lingard
OR
=B10& " "&C10

The UPPER function converts text to uppercase
=UPPER(B10)
LOWER does the opposite

Text with Extra spaces	
Mr. Brooks os	Mr. Brooks os
harry kane	harry kane
Jesse lingard	Jesse lingard
Anthony martial T	=TRIM(E7)

The trim function
The TRIM () and CLEAN () clean up any strings of text you run through them. TRIM ()
removes any leading and trailing spaces; it also changes any series of more than one space to a single space.
N.B: More TEXT functions examples at the back

7. LOOKUP & REFERENCE

Question: Find the marks for Thor in Maths

	A	B	C	D
1	Names	Maths	English	physics
2	Lucky	99	12	90
3	Thor	72	89	91
4	Munni	92	96	84
5	sheila	69	65	56

Solution:

	A	B
	Name	Maths
1	Thor	=VLOOKUP(A1,A1:D5, 2, 0)

Because Maths is in Column 2 — 0 or 1 for exact match

Syntax:

=Vlookup(lookupvalue, table array, col_index, [range lookup])

(Check out hlookup)

8. DATABASE FUNCTIONS.

Question: calculate the number of H.P Computers remaining in Stock

	A	B	C	D	E	F
6	Computer	HDD	Processor	Memory	Quantity	Prices
7	Acer	1000	2.7	8	10	1100
8	Lenovo	750	2.4	6	5	950
9	HP	750	2.3	16	8	1500
10	Asus	500	3.0	4	20	800
11	Acer	1000	2.1	6	5	1800
12	HP	750	2.0	8	4	750
13	Lenovo	750	2.7	6	2	2500

Solution:

	A	B	C	D	E	F
1	Computer	HDD	Processor	Memory	Quantity	Prices
2	HP					

Syntax: =DSUM (database, field, criteria)

=DSUM (A6:F13, E6, A1:F2) Returns 12

N.B: If cell A2 is left blank then it will return no. of stock for all the products i.e. 54

9. FINANCIAL FUNCTIONS

Before you start using Excel's financial functions, it helps to understand the financial concepts that lie at the heart of many of these operations. Here are some terms that those wacky accountants love to use:

• Present Value (PV). The value of an investment or loan at the very beginning of its life. (Hopefully, after this point, the investment will rise or you'll begin to pay off the loan.) This number's also called the principal.

• Future Value (FV). The value of an investment or loan at some point in the future.

• Rate. The rate at which an investment or loan will increase or decrease. A typical investment could have an annual interest rate of 5 percent, which means that after one year, the future value will be 5 percent larger than the present value.

• Payment (PMT). An amount of money you contribute to an investment or loan. It's a regular contribution, usually made at the same time as the interest on the investment or loan is calculated.

• Number of Payment Periods (NPER). The total number of payment periods between the present value and the future value of an investment or loan. If you've got a three-year car loan (with payments due monthly), the NPER equals 36—in other words, there are 12 payment periods each year, for 3 years.

The FV Function

FV calculates the future value of a fixed investment earning a fixed interest over a specified period.

Example 1

let's say, you want to plan for your retirement in 20 years and decide to invest Ksh. 20,000 each year. If the investment pays 20% interest compounded annually, the formula would be:

=FV(20%,20,-20000)

You would collect Ksh. 3,733,760 after 20 years.

Example 2

Mr. Brooks invested 50,000 on PS4 that matures after 3 years and pays 4% interest. How much will the PS4 grow to after 3 years???

Sln: present value is 50,000, no of payment periods is 3 yrs, I =4%, PMT=0, Type is *blank*
=FV(4%,3,0,-50,000)

N.B: Its -50,000 because it's an outflow

	A	B
1	Principal	10,000
2	Interest rate	5%
3	years	2
4	Payment/yr	12
5	Monthly payment	100

FV (rate, nper, pmt, pv, type)

Returns the future value of an investment based on periodic, constant payments and a constant interest rate.

Type: if you are going to make payments at the begging of the period use 1 else 0 or omit if payment is at the end of the period (beginning or end of the month)

=FV(5%/12, 2*12, -100, -10,000, 1)
=FV(B2/12, B3*12, -B5, -B1, 1)

- ✓ If I invest 1,000/= in the bank at a 5% interest rate for 6 years. How much money will I have after 6 years?
  Mathematically it would be
  $=1000 * (1 + 5\%)^{6}$
  =1,340

THE PMT FUNCTION

calculates the payment for a loan based on constant payments and a constant interest rate.

Syntax =PMT(rate, nper, pv)

Rate: interest rate for the loan
Nper: total no of payments for the loan
Pv: present value/PRINCIPAL

N.B: If you make *monthly* payments on a 4 year loan at an *Annual interest* rate of 12 then
=PMT(12%/12, 4 * 12, …….)
If you make an *Annual payment* on the same loan then
=PMT(12, 4,……..)
To find the total amount paid over the duration of the loan,
multiply the returned PMT value by NPER

Example;

A businessman took out a Ksh. 800,000 loan for 4 years at an annual Interest Rate of 26%, compounded monthly. If the monthly installments are paid on the last day of each month, determine the installment to be paid
.
=PMT(800000,0.26/12,48)

The Monthly installment is 26,973.85

Note. The Interest is divided by 12 in order to get the monthly rate, and term (in years) is multiplied by 12 to convert it into months.

Tip To find the total amount paid over the duration of the loan, multiply the returned PMT value by nper.

Data	**Description**
8%	Annual interest rate

Data	Description
10	Number of months of payments
$10,000	Amount of loan

Formula	Description	Result
=PMT(A2/12,A3,A4)	Monthly payment for a loan with terms specified as arguments in A2:A4.	($1,037.03)
=PMT(A2/12,A3,A4)	Monthly payment for a loan with with terms specified as arguments in A2:A4, except payments are due at the beginning of the period.	($1,030.16)

Data	Description
6%	Annual interest rate
18	Number of months of payments
$50,000	Amount of loan

Formula	Description	Live Result
=PMT(A12/12,A13*12, 0,A14)	Amount to save each month to have $50,000 at the end of 18 years.	($129.08)

The Net Present Value Function

is a more specialized function that can help you decide whether to make an investment or embark on a business venture by calculating net present value. To understand net present value, you first need to understand the concept of present value, which is the value that a projected investment has today. If you have an investment that earns 5 percent monthly interest and is worth $200 at maturity (after one month), its present value is $190.48.

Syntax: **=NPV *(rate, value1, value2, …)***

Returns the net present value of an investment based on a discount rate and a series of future payments (*negative values)* and income *(positive values)*

Here's how to calculate the net present value of the four-year investment:

=NPV (5%, 2000, 6500, 10000, 12500)

Excel counts each cash flow as one period. Thus, this formula covers four periods.
Because the calculation uses an annual interest rate (5%), each period represents a full year. The formula returns a result of $26,722.61. In other words, to generate the same amount of money as your business will, you'd need to invest $26,722.61 initially at an annual interest rate of 5 percent.

10. DATE FUNCTIONS

Today ( ) - returns todays date that is automatically updated with the system date i.e. 17-Oct-19
Now ( ) - returns todays date and time together 17-Oct-19 08:24 pm

If cell C5 is having a date value e.g. 17-Oct-19

Then =*day(c5)* returns 17
=*month(c5)* returns 10
=*year(c5)* returns 2019

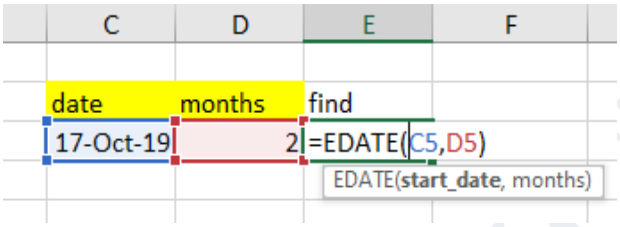
Adding/deducting Dates
If Glen borrowed a book on 17th October 2019 and return date is after a week, calculate the *return date*?
If cell C5 is having a date value e.g. 17-Oct-19

=C5 + 7

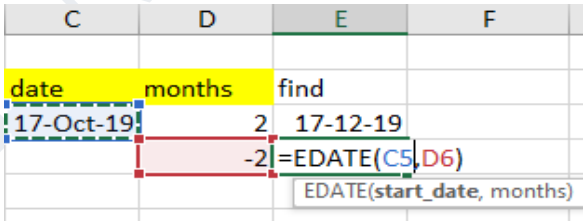
If Rashford returned a book on 17th October 2019 and took one week with it, calculate the day he borrowed the book?

=C5 – 7

Adding/deducting months
When it comes to months then we twerk the functions a little bit……. we use EDATE

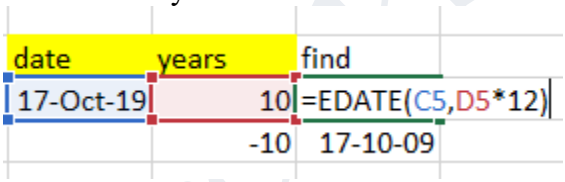


Adding 2 months

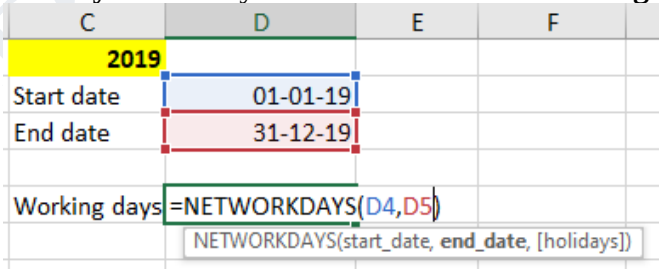


deducting 2 months

Adding/deducting Years
Let's add 10 years to our date……. returns 17-Oct-2029

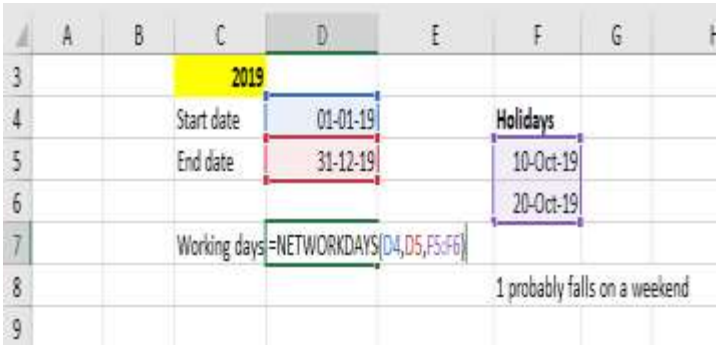


N.B: Note that in a Year we have ***52 weeks***, **all Saturdays and Sundays** are **104**…….therefore **365 days – 104** days means we have **261 working days**

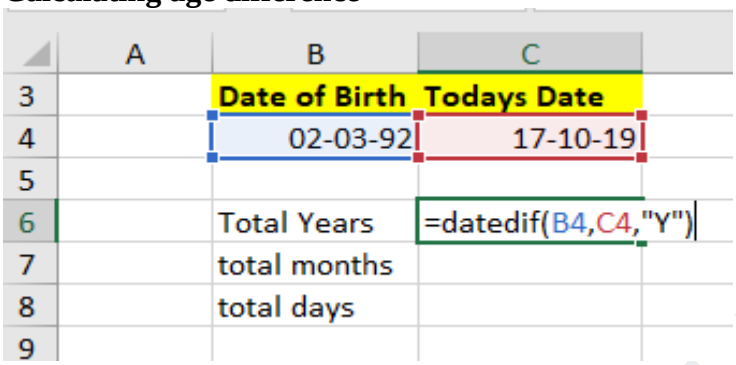


will return 261 with no holidays specified.

How to find network days with holidays



Calculating age difference



To find months' fix **M,** for days' fix **D**

Calculating no of days remaining within

=Days(enddate, startdate)

START DATE	END DATE	DAYS REMAINING
01-10-19	26-10-19	=DAYS(D10,C10)

DAYS(end_date, **start_date**)

or =Datedif(startdate, enddate, "D")

DATE	MONTH
2 March, 1992	=MONTH(E4)
30 April, 2019	4
2 March, 1992	3
3 March, 1992	3
4 August, 1992	8

=MONTH(Serial)

Which Week of the Month?

Can be answered using the date function, it will return an integer e.g if today is 17th Jan, returns 3 (week 3)
=WEEKNUM(NOW())

MORE TIPS

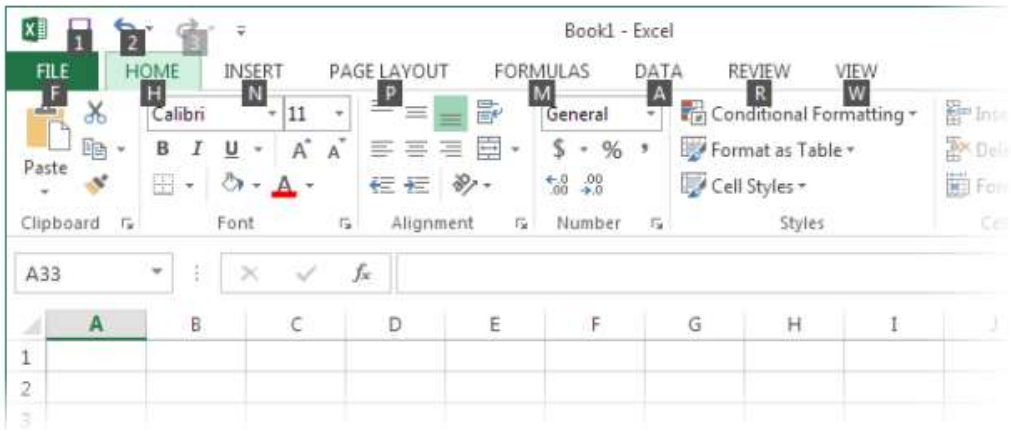


FIGURE 1-13

When you press Alt, Excel displays KeyTips next to every tab, over the File menu, and over the buttons in the Quick Access toolbar. If you follow up with M (for the Formulas tab), you'll see letters next to every command in that tab, as shown in Figure 1-11.

The status bar combines several types of information. The leftmost area shows Cell Mode, which displays one of three indicators:

- **Ready** means that Excel isn't doing anything much at the moment, other than waiting to execute a command.
- **Enter** appears when you start typing a new value into a cell.
- **Edit** means you currently have the cell in edit mode, and pressing the left and right arrow keys moves through the data within a cell, instead of moving from cell to cell. You can place a cell in edit mode or take it out of edit mode by pressing F2.

FLASH FILL

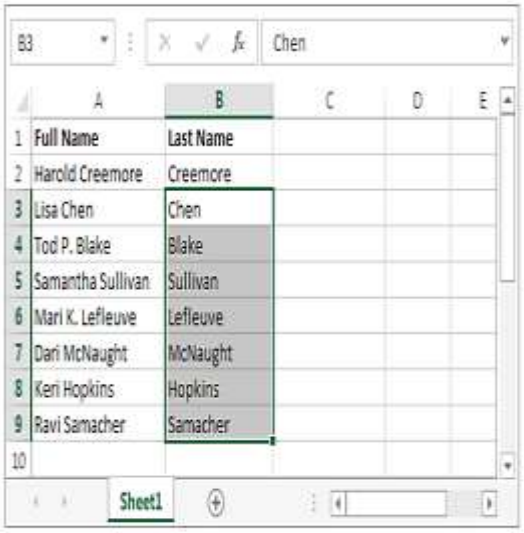
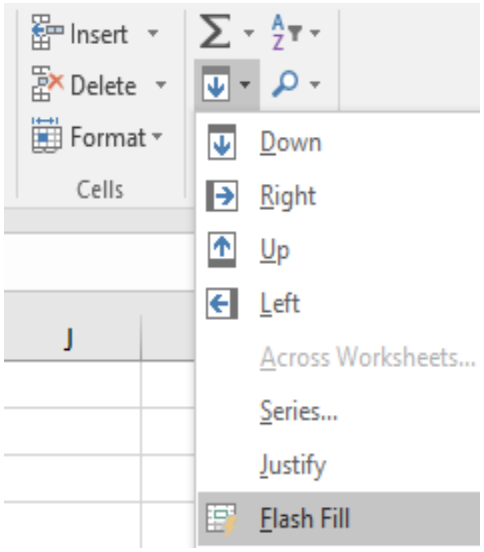


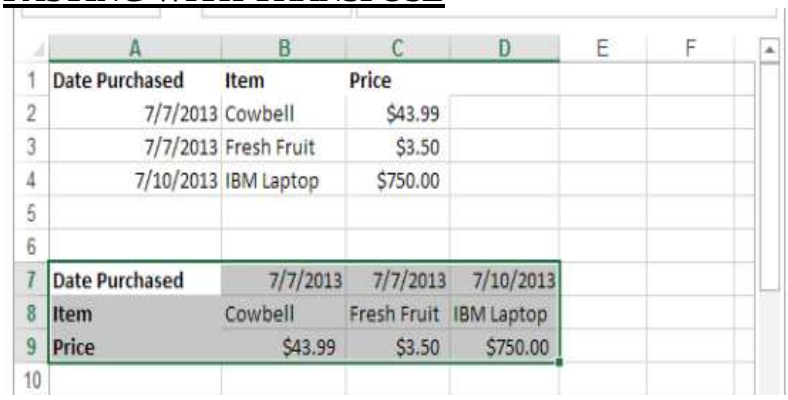
FIGURE 2-13

Press Ctrl+E once and Excel extracts the last name from every other cell in column A, and copies it into the blank cells in column B.



Once it figures out a pattern, it will do the rest if you press CTRL + E **OR** on the **HOME TAB** click **Flash fill**
N.B: Check out use of Text **to Columns** from the DATA TAB explained Below

PASTING WITH TRANSPOSE



	A	B	C	D	E	F
1	Date Purchased	Item	Price			
2	7/7/2013	Cowbell	$43.99			
3	7/7/2013	Fresh Fruit	$3.50			
4	7/10/2013	IBM Laptop	$750.00			
5						
6						
7	Date Purchased	7/7/2013	7/7/2013	7/10/2013		
8	Item	Cowbell	Fresh Fruit	IBM Laptop		
9	Price	$43.99	$3.50	$750.00		
10						

With the Transpose option (from the Paste Special window), Excel pastes the table at the top and transposes it on the bottom.

PASSWORD PROTECTION

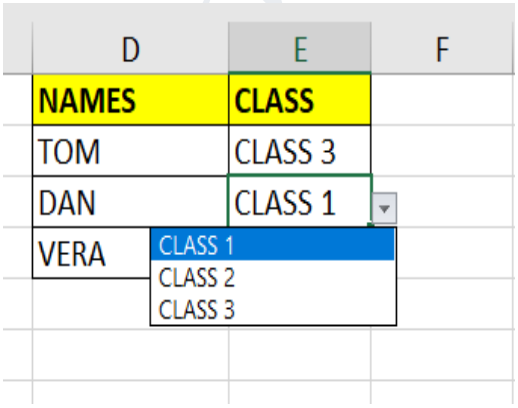
Protection can be done in Excel in 3 ways

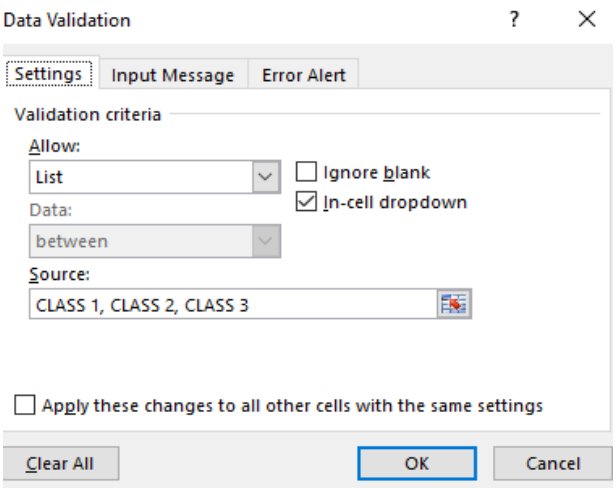
- Password protection for the whole *workbook*
  - File menu > Info > Protect workbook
- Password protection for the *worksheet*/during data entry
  - Review Tab > Changes Group > Protect sheet
- Looking few *cells* and leaving others for Data entry
  - *Select* the range you want to remain editable
  - Go to the Font *drop_down* and uncheck *locked* option under *protection*
  - Finally go to the *Review Tab* > Changes group > *protect sheet*

N.B: You can create your own Excel functions by writing a series of instructions using VBA (Visual Basic for Applications) code.

How to Create a Drop-Down list.

First select the column cells, go to the *Data Tab* and click *Data Validation*.





What-IF Analysis

1. Using Scenario manager

BROOKS I.C.T MULTI-VERSE				
PRODUCTS	% DISCOUNTS	MARKET PRICE	OUR PRICES	LOSS
LAPTOP	20%	40,000	32000	8,000
H.D.D	15%	7,000	5950	1,050
CHARGER	10%	3,000	2700	300
	TOTALS	KES 50,000	KES 40,650	KES 9,350

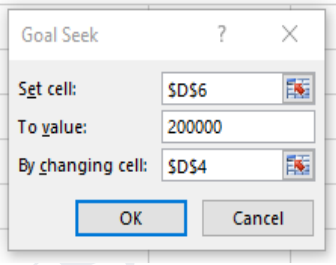
Assuming that you are working for the company and the management would like to know in December if they can increase/decrease the discount % depending on the market price……. you can create *best*, *current*, and *worst* case scenarios plus create a summary to study the Total loss through the cases.
Data Tab > Forecast group > what if analysis > scenario manager

2. Goal Seek.

Often used in cases where you know the End Results but you don't know how to get there

ITEM	APPLES	
UNITS SOLD	1200	*input*
PRICE PER	99	*input*
REVENUE	118800	*calculated*

Q1: How much units do we need to sell in order to make a revenue of 200,000/= ?



N.B: In order to change several cells, use *Solver*

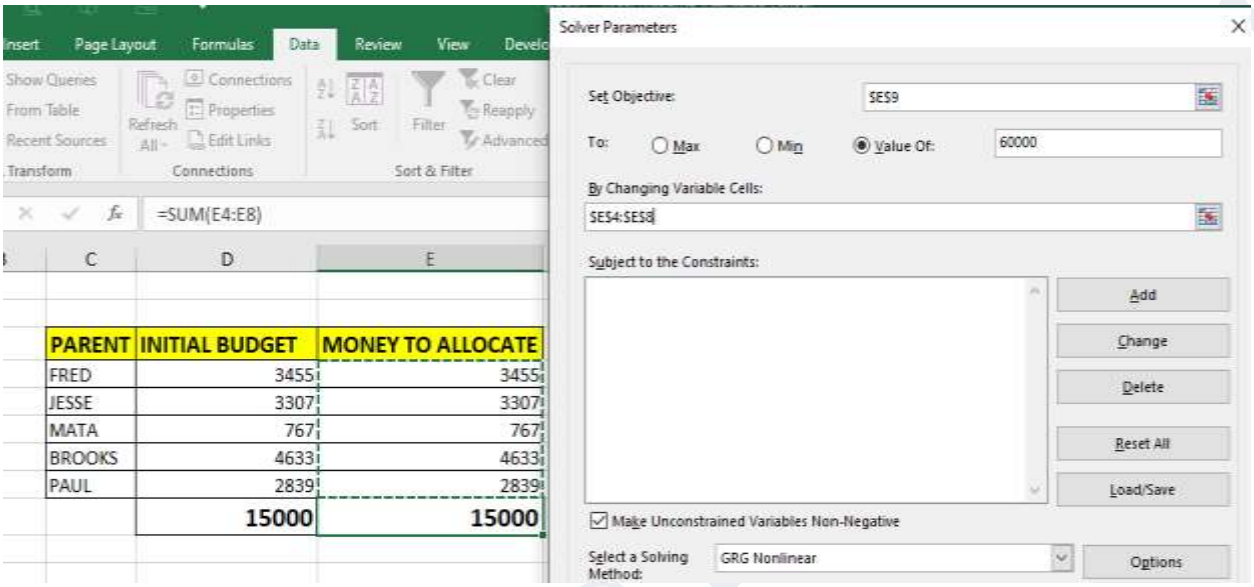
3. How to use the Solver in Excel for Data Analysis.

- Solver is a Microsoft Add-In Program you can use for what-if analysis to find an *optimal* (max/min) value for a formula in one cell (called the *objective cell*) subject to *constraints* on the other cells.
- To activate it, go to File, excel options, manage Add-ins, activate the Solver Add-in.
- The *objective* cell **must always have a formula**.
- If you want the value of the *objective cell* to be as large as possible, use **max**. if you want it to be as small as possible use **min** or set a **value** to a certain desired number.
- To create a report that is based on your solution after solver finds a solution, you can click a *report* type in the report box then click OK.

Sample question 1.

Assuming the parents had an initial budget in column D of *15,000*, copy the same content to column E.
Let both totals to be calculated totals…. assuming they have **Re-adjusted** the budget and now they would like to calculate **How much money to Allocate** now that they have *60,000.*

Set *objective* to cell E9, Value to 60k, by changing cells in column E, finally click OK
Data Tab > Analyze group > Solver



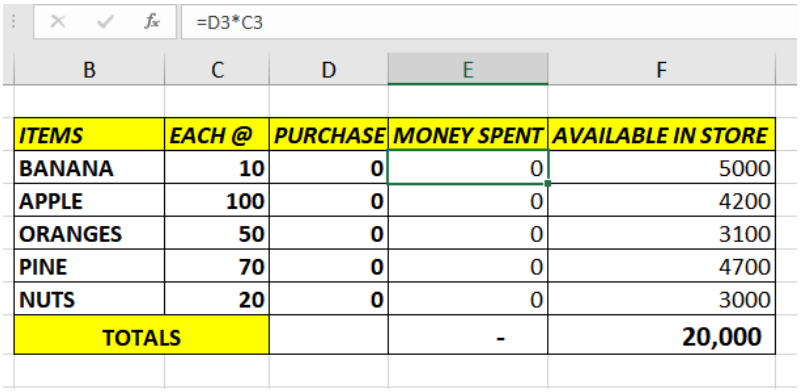
Solution:

PARENT	INITIAL BUDGET	MONEY TO ALLOCATE
FRED	3455	13592
JESSE	3307	12596
MATA	767	1267
BROOKS	4633	22861
PAUL	2839	9684
	15000	**60000**

- You can choose any of the following three algorithms/solving methods in the solver parameters dialog box.
Generalized Reduced Gradient (GRG): this is the most commonly used method to solve non-linear problems. It looks for a local optimal solution.
LP Simplex: used to solve problems that are linear
Evolutionary: This is used to solve more complex and non-smooth no-linear problems. It looks for a global optimal solution which makes it take longer to run compared to GRG

N.B: Compare with **Goal seek** which only allows you to change one value

Sample Question 2:
How many purchases are we able to make if we intend to spend only *15,000/=* on the available items.
N.B: The money spent should not be more than the value of items Available in the store.

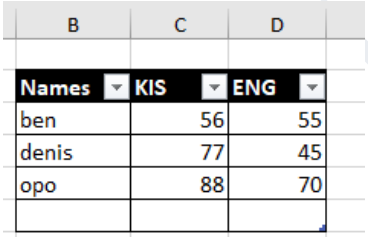


Set the total money spent as your *objective*, to a value of 15,000 by changing cells in purchase column.
Then finally set the *constraints* such that the money spent shouldn't be more than the number of items in the store.
Solution:

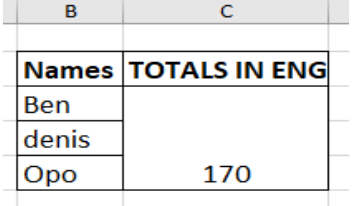
ITEMS	EACH @	PURCHASE	MONEY SPENT	AVAILABLE IN STORE
BANANAS	10	60	600	5000
APPLES	100	42	4200	4200
ORANGES	50	62	3100	3100
PINEAPPLE	70	67	4700	4700
NUTS	20	120	2400	3000
TOTALS			15,000.00	20,000

WORKING WITH TABLES.

After entering the data below, it was formatted as a table named *Table4* in **SHEET 1**



Thereafter to generate the total below in **SHEET 2**, the following function was used



=SUM(Table4[ENG])

N.B: Any changes made in the table is reflected on the totals in sheet 2

USING EXCEL FORECAST FUNCTION.

	Month	Month	Revenue
2	Jan	1	$ 372,125
3	Feb	2	$ 354,379
4	Mar	3	$ 400,515
5	Apr	4	$ 460,283
6	May	5	$ 305,770
7	Jun	6	$ 431,061
8	Jul	7	=FORECAST(B8,$C$2:$C$7,$B$2:$B$7)
9	Aug	8	
10	Sep	9	
11	Oct	10	
12	Nov	11	
13	Dec	12	

The first argument in forecast function is **X,** for this we need to select what is the next period i.e. next month number in our example which is **B8**,
next argument is known as **Ys**, this is nothing but what is the revenue already archived so far in the previous months i.e. **C2:C7** and they must be absolute reference.
The final argument is known as **Xs**, for this we need to select previous month numbers i.e. **B2:B7** and they must be absolute reference.
There after close the bracket and press enter and auto fill.

INDEX Function

Is used to get the value of a cell in a given table by specifying the number of the *row* or *column* or *both* that you are looking for e.g. to get the name of an employee at the 5th row below, =INDEX(C4:C9,5,2) it would return MATA

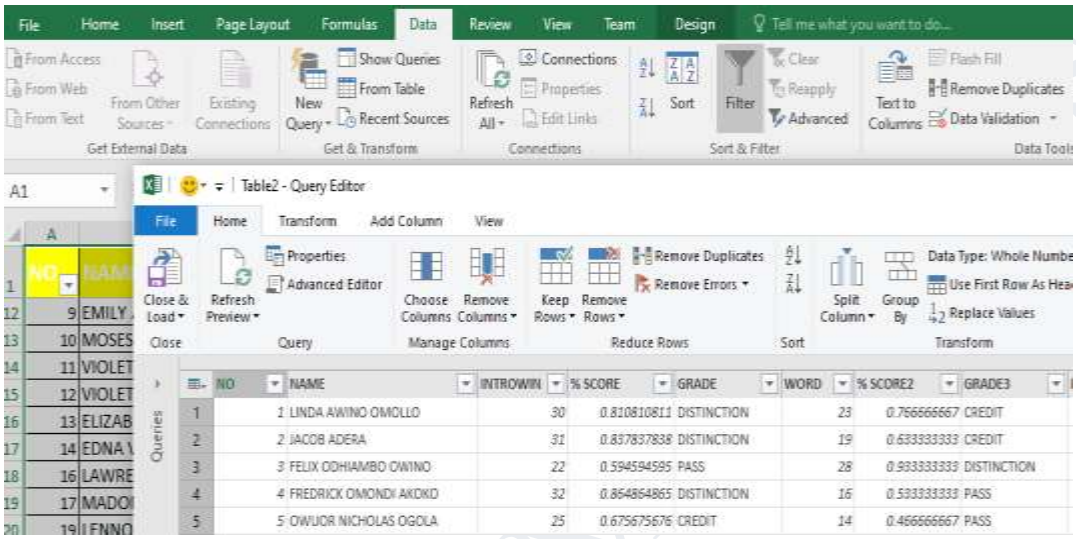
AWENDO ICT CENTER	
EMPLOYEE ID	EMPLOYEE
1	DAN
3	TOM
2	KEEN
6	JESSE
4	MATA
8	ODOI

=INDEX(B4:C9,5,2)

HOW TO COMBINE MULTIPLE WORKSHEETS.

Two or more ***worksheets*** can be linked in one new worksheet that can be automatically refreshed/updated whenever a change is done in any of the sheets.

- First select the Data from both tables and format them as tables
  Home Tab > Styles group > format as table
- Go to the Data Tab, under get and transform group click *from table*



- Then close and load to > under load to choose, *only create connection*
- Repeat step 2 and 3 for the second sheet and have all of them having connections to your workbook.
- Under *Data tab* click New Query, choose *combine queries* and Append sheet 1 to 2 or vice-versa
- Done, make any change you wish
- There after *close and load* as table in your workbook

DATA CONSOLIDATION

Same results can be achieved by using data consolidate command on the DATA TAB, Marks for Comp studies in Sheet 1 for term 1, sheet 2 term 2 can be consolidated in sheet 3 as totals for term 3

ADDITIONAL CONCEPTS.

- ✓ Functions can be **nested** together, for example
  =IF(ISERROR(A7), "ELIGIBLE", A7)

  If it finds an error in cell A7, it will display ELIGIBLE else it will display the number

  Ex: If cell A7 is having values on revenues and we are trying to check if the value is more than 15,000 but less than 20,000, then

  =IF(AND(A7>15,000, A7<20,000), "Revenue within budget", "Revenue out")

- ✓ To change an array of values in all cells selected, type the new value in the 1st cell then press **CTRL + ENTER** and all the selected cells in the array will change to that new types value

- ✓ **Linking** worksheets
  e.g. =A7 + SHEET2!A10

- ✓ Inserting **comments**
  Helps other who are less familiar with the worksheet or even the designer can recall specific info in the future

- ✓ **Freezing** panes
  VIEW TAB > Window group > freeze panes
  To freeze any specific row press ALT + W + F + R, column ALT+W+F+C

- ✓ To **switch** between windows
  VIEW TAB > Window group > switch windows

- ✓ **GOTO** special is used to select all blanks cells in a range
  (for deletion or to have same content using CTRL + ENTER)

  Select the data set > Home tab, editing group > click Goto special > select Blanks and click Okay

- ✓ To Use **Format Painter** more than once – Double Click the Format Painter and use it as many times as you like. When you're done press ESC. Only applies in Excel 2007 and higher.

- ✓ **Synchronous Scrolling** – want to compare two workbooks and have them both scroll at the same time? With two workbooks open > View tab of the ribbon > **View side by side** > Synchronous Scrolling

- ✓ How to find and format **duplicates** in your worksheet
  Select the whole data range > Home tab > conditional formatting > highlight cells rules > Duplicate values
  After this you can use the *Remove duplicate* command in the data tab….
  N.B: It only works when the full row is a duplicate i.e. if Row 3 full is same as maybe Row 7 full

- ✓ **PIVOT Table**
  Use it to compare different columns and rows in tables, use recommended pivot tables and try out the *slicers* to filter data

✓ **BAR CODES:** can be input directly into cell values after you download the *barcode font* and install it….

AutoFill a Series or Formulas – Double Click on the + symbol on the bottom right of a cell that is adjacent to the range you want to fill.

Before

	A	B
1	1	Monday
2	2	Tuesday
3	3	
4	4	

After

	A	B
1	1	Monday
2	2	Tuesday
3	3	Wednesday
4	4	Thursday

Force a carriage return in a cell instead of wrapping the text – ALT+ENTER while editing the cell.

N.B:
Obviously, once you go **beyond 26 columns**, you run out of letters. Excel handles this by doubling up (and then tripling up) letters. For example, after column Z is column AA, then AB, then AC, all the way to AZ and then BA, BB, BC—you get the picture. And if you create a ridiculously large worksheet, you'll find that column ZZ is followed by AAA, AAB, AAC, and so on

✓ If you choose Home→Cells→Format→AutoFit Column Width, Excel automatically sizes the column to fit the content in the current cell. Or you can select a group of cells and use this command to size the column to fit the widest value in the group.

✓ In Excel 2010, there are a total of **1,048,576** ROWS, with **16,384** COLUMNS [Ranging A-XFD]

✓ **Watch window** in excel is used to watch for changes in the formulas we use while working with a large amount of data and formulas.

✓ **Excel Power Query** is used for searching data sources, making connections with data sources, and then shaping the data according to our analyzing requirement. Once we are done with that we can also share our findings and create various reports using more queries. Fundamentals ***Combine, transform, combine, manage.***

✓ **Ratio** is one of the common methods used to compare two values.

first num	second num	
10	5	=G3/H3&":"&"1"

OR

first num	second num		
10	5	2:1	=SUBSTITUTE(TEXT(G3/H3,"####/####"),"/",":")

✓ Types of **pointers** in Excel
a. *Doctor's symbol (Big Plus)*
b. *small thin plus icon*
c. *Mouse Pointer with anchor at the tip*

✓ TEXT FUNCTIONS CONTINUED.

B	C	D	E	F
INPUT STRING	LENTH	MID	LEFT	RIGHT
JUAN MATA	9	JUAN	J	MATA

=LEN(B2) =MID(B2,1,4) =LEFT(B2,1) =RIGHT(B2,5)

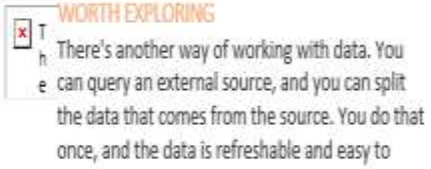
✓ MORE ON ARRAYS

An array formula can perform calculations on more than one cell in an array. You always finish an array formula with CTRL+SHIFT+ENTER, not just ENTER. Pressing CTRL+SHIFT+ENTER calculates the function against the array. When you're done, Excel puts special brackets { } around the formula. These brackets are a visual clue that the selected cell is part of an array formula. You can't type these brackets yourself. Excel puts them in when you press CTRL+SHIFT+ENTER.

✓ Someone filled three cells with yellow. You can sort the rows by that color. Right-click a yellow cell, and then click **Sort** > **Put Selected Cell Color on Top**.

Daily Hours Worked	
Time In:	8:00 AM
Lunch Out:	12:00 PM
Lunch In:	1:00 PM
Time Out:	5:00 PM
Total Hours:	=((D35-D32)-(D34-D33))*24

✓ Instead of using flash fill to separate columns, we could use **text to columns** option from the data tab



More conditional functions

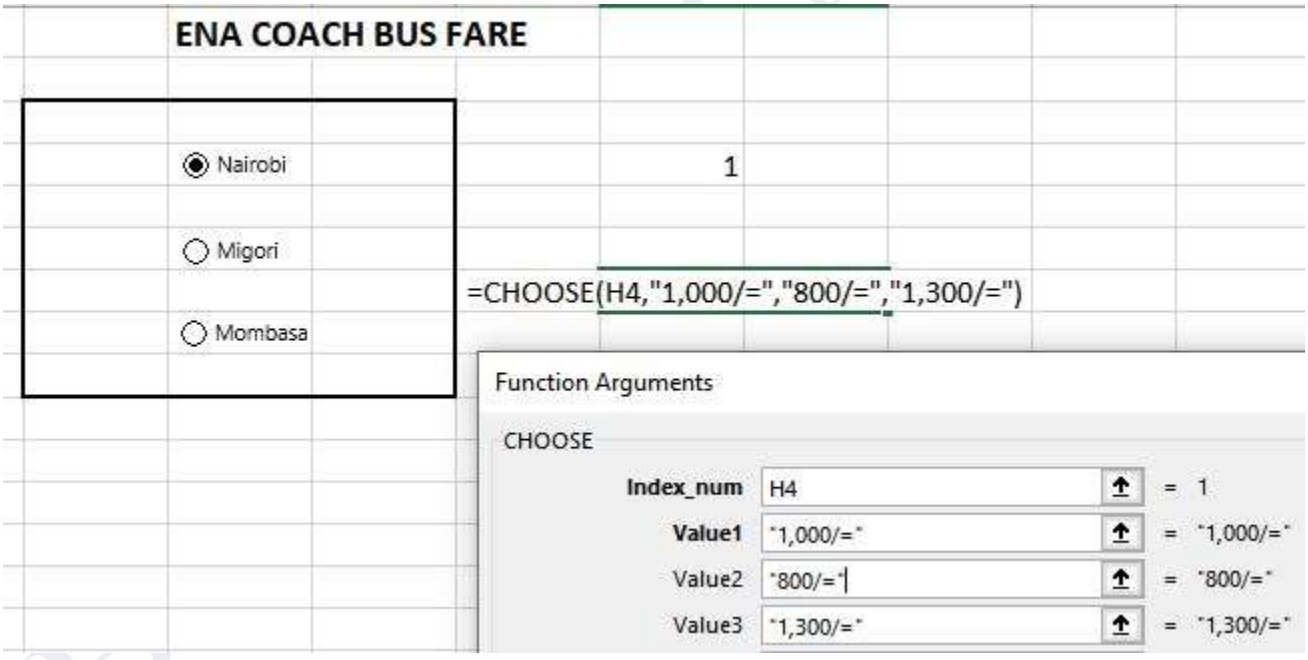
You've already seen SUMIF, SUMIFS, COUNTIF, and COUNTIFS. Now you can try on your own with the other functions, such as **AVERAGEIF/S**, **MAXIFS**, **MINIFS.** They're all structured the same way, so once you get one formula written, you can just replace the function name with the one you want. We've written all the functions you'll need for cell E106, so you can copy/paste these, or try to type them yourself for practice.

SUMIF	**=SUMIF(C92:C103,C106,E92:E103)**
SUMIFS	**=SUMIFS(E92:E103,C92:C103,C106,D92:D103,D106)**
AVERAGEIF	**=AVERAGEIF(C92:C103,C106,E92:E103)**
AVERAGEIFS	**=AVERAGEIFS(E92:E103,C92:C103,C106,D92:D92,D106)**
COUNTIF	**=COUNTIF(C92:C103,C106)**
COUNTIFS	**=COUNTIFS(C92:C103,C106,D92:D103,D106)**
MAXIFS	**=MAXIFS(E92:E103,C92:C103,C106,D92:D103,D106)**
MINIFS	**=MINIFS(E92:E103,C92:C103,C106,D92:D103,D106)**

Fruit	Type	Amount
Apples	Fuji	50
Oranges	Florida	20
Bananas	Cavendish	60
Lemons	Rough	40
Apples	Honeycrisp	50
Oranges	Navel	20
Bananas	Lady Finger	60
Lemons	Eureka	40
Apples	Honeycrisp	50
Oranges	Navel	20
Bananas	Cavendish	60
Lemons	Eureka	40

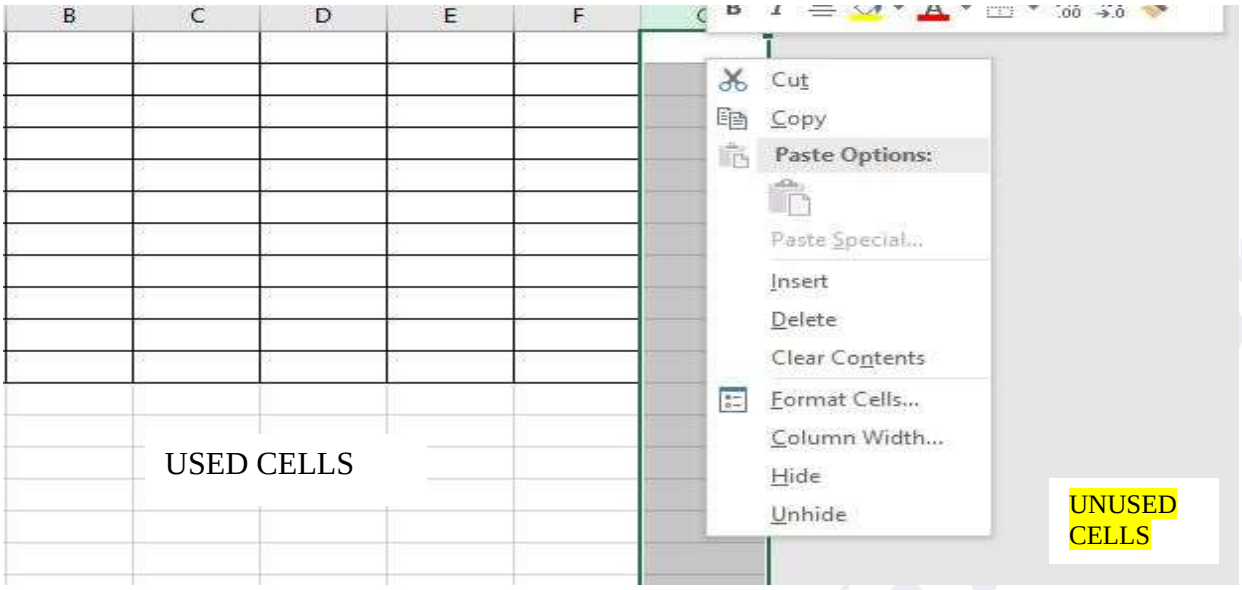
Fruit	Type	Try it
Lemons	Eureka	80

THE CHOOSE FUNCTION



Hide Non-Used Cells on your Worksheet.

Select the last column or row, use the shortcut CTRL + SHIFT + Left Arrow, there after right click and click HIDE



ERRORS IN EXCEL

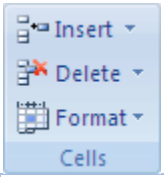
Correct a ##### error

This error occurs when a column is not wide enough, or a negative date or time is used.

- Review the following possible causes and solutions.

⊞ The column is not wide enough to display the content

1. Select the column by clicking the column header.
2. On the **Home** tab, in the **Cells** group, click **Format**, and then click **AutoFit Column Width**.



TIP ALTERNATIVELY, you can double-click the boundary to the right of the column heading.

3. Select the column.
4. On the **Home** tab, in the **Cells** group, click **Format**, click **Format Cells**, and then click the **Alignment** tab.
5. Select the **Shrink to fit** check box.

⊞ Dates and times are negative numbers

- If you are using the 1900 date system, dates and times in Microsoft Office Excel must be positive values.
- When you subtract dates and times, make sure that you build the formula correctly.
- If the formula is correct but the result is still a negative value, you can display the value by formatting the cell with a format that is not a date or time format.

1. On the **Home** tab, in the **Cells** group, click **Format**, click **Format Cells**, and then click the **Number** tab.

2. Select a format that is not a date or time format.

Correct a #DIV/0! error

This error occurs when a number is divided by zero (0).

1. Optionally, click the cell that displays the error, click the button that appears  , and then click **Show Calculation Steps** if it appears.
2. Review the following possible causes and solutions.
   - Entering a formula that contains explicit division by zero (0) — for example, =5/0
   - Using the cell reference to a blank cell or to a cell that contains zero as a divisor

- Change the cell reference to another cell.
- Enter a value other than zero in the cell used as a divisor.
- Enter the value **#N/A** into the cell referenced as the divisor, which changes the result of the formula to #N/A from #DIV/0! to denote that the divisor value is not available.
- Prevent the error value from displaying by using the IF worksheet function. For example, if the formula that creates the error is =A5/B5, use =IF(B5=0,"",A5/B5) instead. The two quotation marks represent an empty text string.
  - Running a macro that uses a function or a formula that returns #DIV/0!

Correct a #N/A error

This error occurs when a value is not available to a function or formula.

1. Optionally, click the cell that displays the error, click the button that appears  , and then click **Show Calculation Steps** if it appears.
2. Review the following possible causes and solutions.
   - Missing data, and #N/A or NA() has been entered in its place
   - Giving an inappropriate value for the lookup_value argument in the HLOOKUP, LOOKUP, MATCH, or VLOOKUP worksheet function
   - Using the VLOOKUP, HLOOKUP, or MATCH worksheet function to locate a value in an unsorted table
   - Using an argument in an array formula that is not the same number of rows or columns as the range that contains the array formula
   - Omitting one or more required arguments from a built-in or custom worksheet function
   - Using a custom worksheet function that is not available
   - Running a macro that enters a function that returns #N/A

Correct a #NAME? error

This error occurs when Microsoft Office Excel doesn't recognize text in a formula.

1. Optionally, click the cell that displays the error, click the button that appears  , and then click **Show Calculation Steps** if it appears.
2. Review the following possible causes and solutions.
   - Using the EUROCONVERT function without the Euro Currency Tools add-in being loaded
     1. Click the **Microsoft Office Button** , click **Excel Options**, and then click the **Add-ins** category.
     2. Select **Excel Add-ins** in the **Manage** list box, and then click **Go**.
     3. In the **Add-Ins available** list, select the **Euro Currency Tools** check box, and then click **OK**.
   - Using a name that does not exist
   - Misspelling the name

- Misspelling the name of a function
- Entering text in a formula without enclosing the text in double quotation marks
- Omitting a colon (:) in a range reference
- Referencing another sheet not enclosed in single quotation marks

Correct a #NULL! error

This error occurs when you specify an intersection of two areas that do not intersect. The intersection operator is a space between references.

1. Optionally, click the cell that displays the error, click the button that appears  , and then click **Show Calculation Steps** if it appears.
2. Review the following possible causes and solutions.
   - Using an incorrect range operator
     - To refer to a contiguous range of cells, use a colon (:) to separate the reference to the first cell in the range from the reference to the last cell in the range. For example, SUM(A1:A10) refers to the range from cell A1 to cell A10 inclusive.
     - To refer to two areas that don't intersect, use the union operator, the comma (,). For example, if the formula sums two ranges, make sure that a comma separates the two ranges (SUM(A1:A10,C1:C10)).
   - Ranges do not intersect
     - If there are no squares at each corner of the color-coded border, then the reference is to a named range.
     - If there are squares at each corner of the color-coded border, then the reference is not to a named range.
5. Double-click the cell that contains the formula you want to change. Microsoft Office Excel highlights each cell or range of cells with a different color.
6. Do one of the following:
   - To move a cell or range reference to a different cell or range, drag the color-coded border of the cell or range to the new cell or range.
   - To include more or fewer cells in a reference, drag a corner of the border.
   - In the formula, select the reference, and type a new one.
7. Press ENTER.
8. Do one of the following:
   - Select the range of cells that contains formulas in which you want to replace references with names.
   - Select a single cell to change the references to names in all formulas on the worksheet.
9. On the **Formulas** tab, in the **Defined Names** group, click the arrow next to **Define Name**, and then click **Apply Names**.
10. In the **Apply Names** box, click one or more names.

Correct a #NUM! error

This error occurs with invalid numeric values in a formula or function.

1. Optionally, click the cell that displays the error, click the button that appears  , and then click **Show Calculation Steps** if it appears.
2. Review the following possible causes and solutions.
   - Using an unacceptable argument in a function that requires a numeric argument
   - Using a worksheet function that iterates, such as IRR or RATE, and the function cannot find a result

- Use a different starting value for the worksheet function.
- Change the number of times Microsoft Office Excel iterates formulas.

1. Click the **Microsoft Office Button**  , click **Excel Options**, and then click the **Formulas** category.
2. In the **Calculation options** section, select the **Enable iterative calculations** check box.
3. To set the maximum number of times that Excel will recalculate, type the number of iterations in the **Maximum Iterations** box. The higher the number of iterations, the more time that Excel needs to calculate a worksheet.
4. To set the maximum amount of change that you will accept between calculation results, type the amount in the **Maximum Change** box. The smaller the number, the more accurate the result and the more time that Excel needs to calculate a worksheet.

⊞ Entering a formula that produces a number that is too large or too small to be represented in Excel

Correct a #REF! error

This error occurs when a cell reference is not valid.

1. Optionally, click the cell that displays the error, click the button that appears  , and then click **Show Calculation Steps** if it appears.
2. Review the following possible causes and solutions.

⊞ Deleting cells referred to by other formulas, or pasting moved cells over cells referred to by other formulas
⊞ Using an Object Linking and Embedding (OLE) link to a program that is not running
⊞ Linking to a Dynamic Data Exchange (DDE) topic such as "system" that is not available
⊞ Running a macro that enters a function that returns #REF!

Correct a #VALUE! error

This error occurs when the wrong type of argument or operand is used.

1. Optionally, click the cell that displays the error, click the button that appears  , and then click **Show Calculation Steps** if it appears.
2. Review the following possible causes and solutions.

⊞ Entering text when the formula requires a number or a logical value, such as TRUE or FALSE
⊞ Entering or editing an array formula, and then pressing ENTER
⊞ Entering a cell reference, a formula, or a function as an array constant
⊞ Supplying a range to an operator or a function that requires a single value, not a range

- Change the range to a single value.
- Change the range to include either the same row or the same column that contains the formula.

⊞ Using a matrix that is not valid in one of the matrix worksheet functions
⊞ Running a macro that enters a function that returns #VALUE!