● Excel Formulas & Functions: Learn with Basic EXAMPLES
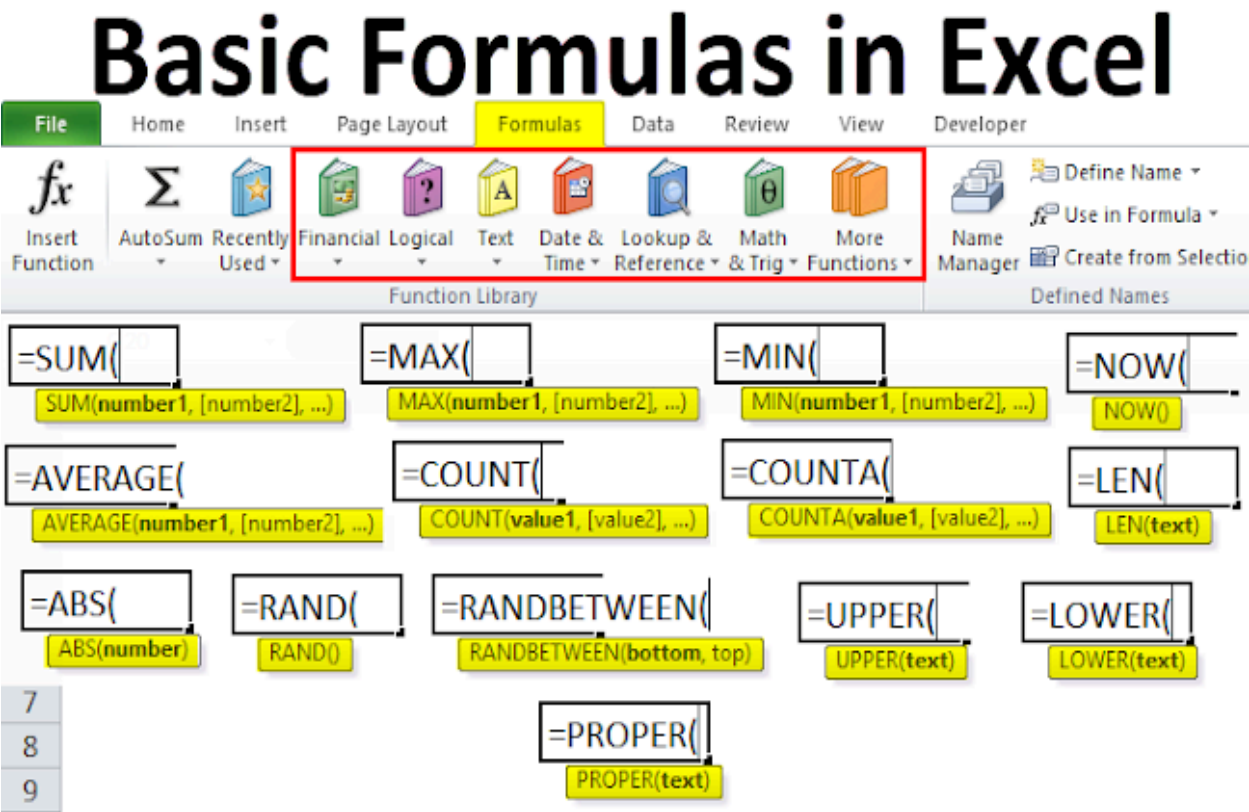

Home supplies budget

S/N	ITEM	QTY	PRICE	SUBTOTAL	Is it Affordable?
1	Mangoes	9	600		
2	Oranges	3	1200		
3	Tomatoes	1	2500		
4	Cooking Oil	5	6500		
5	Tonic Water	13	3900		

House Building Project Schedule

S/N	ITEM	START DATE	END DATE	DURATION (DAYS)
1	Survey land	04/02/2015	07/02/2015	
2	Lay Foundation	10/02/2015	15/02/2015	
3	Roofing	27/02/2015	03/03/2015	
4	Painting	09/03/2015	21/03/2015	

What is Formulas in Excel?

FORMULAS IN EXCEL is an expression that operates on values in a range of cell addresses and operators. For example, =A1+A2+A3, which finds the sum of the range of values from cell A1 to cell A3. An example of a formula made up of discrete values like =6*3.

`=A2 * D2 / 2`

HERE,

- `"="` tells Excel that this is a formula, and it should evaluate it.
- `"A2" * D2"` makes reference to cell addresses A2 and D2 then multiplies the values found in these cell addresses.
- `"/"` is the division arithmetic operator
- `"2"` is a discrete value

Formulas practical exercise

We will work with the sample data for the home budget to calculate the subtotal.

- Create a new workbook in Excel
- Enter the data shown in the home supplies budget above.
- Your worksheet should look as follows.

	A	B	C	D	E
1	Home supplies budget				
2					
3	S/N	Item	Qty	Price	Subtotal
4	1	Mangoes	9	600	
5	2	Oranges	3	1200	
6	3	Tomatoes	1	2500	
7	4	Cooking Oil	5	6500	
8	5	Tonic water	13	3900	

FORMULA GOES HERE C4*D4

We will now write the formula that calculates the subtotal

Set the focus to cell E4

Enter the following formula.

`=C4*D4`

HERE,

- `"C4*D4"` uses the arithmetic operator multiplication (*) to multiply the value of the cell address C4 and D4.
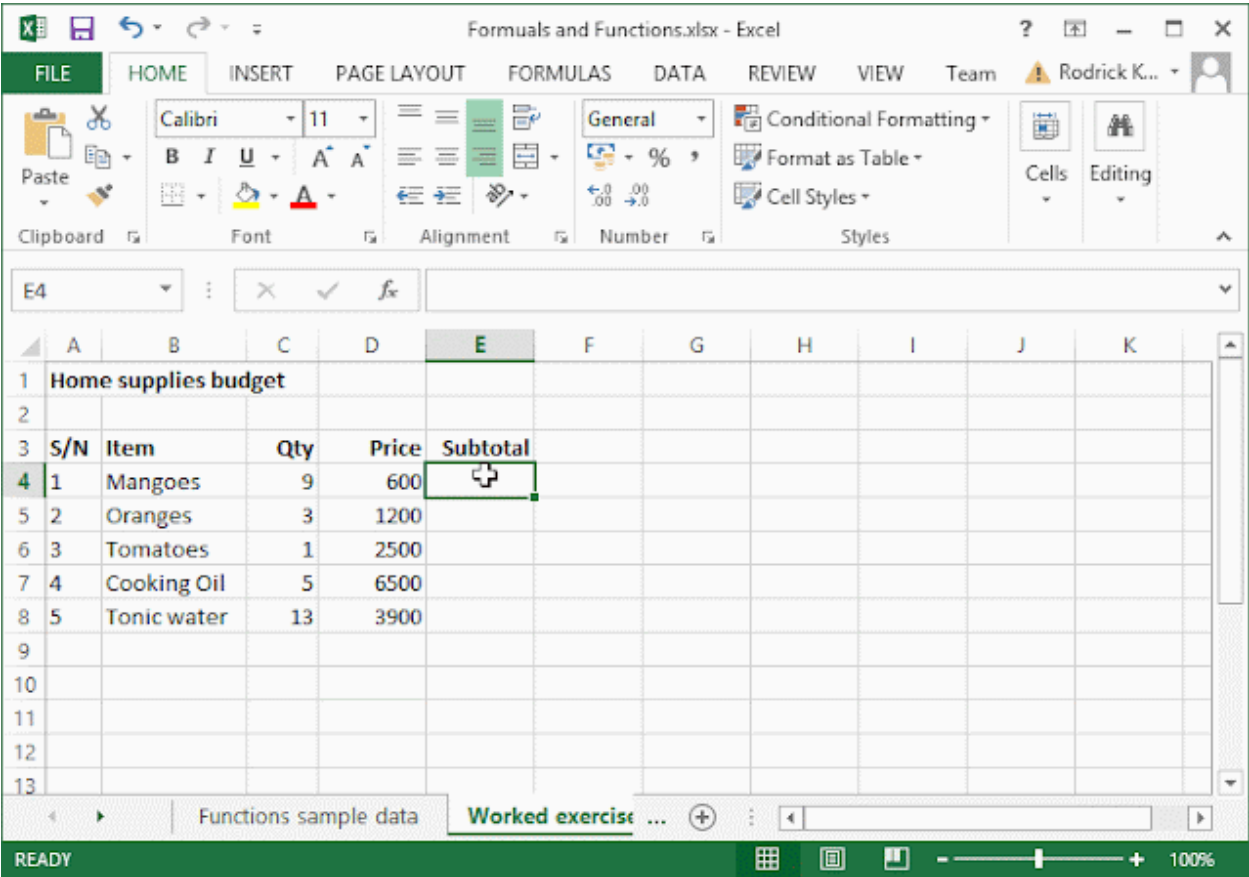
Press enter key

You will get the following result

Formula evaluation result

The following animated image shows you how to auto select cell address and apply the same formula to other rows.

Mistakes to avoid when working with formulas in Excel

1. Remember the rules of Brackets of Division, Multiplication, Addition, & Subtraction **(BODMAS).** This means expressions are brackets are evaluated first. For arithmetic operators, the division is evaluated first followed by multiplication then addition and subtraction is the last one to be evaluated. Using this rule, we can rewrite the above formula as =(A2 * D2) / 2. This will ensure that A2 and D2 are first evaluated then divided by two.
2. Excel spreadsheet formulas usually work with numeric data; you can take advantage of data validation to specify the type of data that should be accepted by a cell i.e. numbers only.
3. To ensure that you are working with the correct cell addresses referenced in the formulas, you can press F2 on the keyboard. This will highlight the cell addresses used in the formula, and you can cross check to ensure they are the desired cell addresses.
4. When you are working with many rows, you can use serial numbers for all the rows and have a record count at the bottom of the sheet. You should compare the serial number count with the record total to ensure that your formulas included all the rows.

What is Function in Excel?

FUNCTION IN EXCEL is a predefined formula that is used for specific values in a particular order. Function is used for quick tasks like finding the sum, count, average, maximum value, and minimum values for a range of cells. For example, cell A3 below contains the SUM function which calculates the sum of the range A1:A2.

- **SUM** for summation of a range of numbers
- **AVERAGE** for calculating the average of a given range of numbers
- **COUNT** for counting the number of items in a given range

The importance of functions

Functions increase user productivity when working with excel. Let's say you would like to get the grand total for the above home supplies budget. To make it simpler, you can use a formula to get the grand total. Using a formula, you would have to reference the cells E4 through to E8 one by one. You would have to use the following formula.

```
= E4 + E5 + E6 + E7 + E8
```

With a function, you would write the above formula as

```
=SUM (E4:E8)
```

As you can see from the above function used to get the sum of a range of cells, it is much more efficient to use a function to get the sum than using the formula which will have to reference a lot of cells.

Common functions

Let's look at some of the most commonly used functions in ms excel formulas. We will start with statistical functions.

S/N	FUNCTION	CATEGORY	DESCRIPTION	USAGE
01	SUM	Math & Trig	Adds all the values in a range of cells	=SUM(E4:E8)
02	MIN	Statistical	Finds the minimum value in a range of cells	=MIN(E4:E8)
03	MAX	Statistical	Finds the maximum value in a range of cells	=MAX(E4:E8)
04	AVERAGE	Statistical	Calculates the average value in a range of cells	=AVERAGE(E4:E8)
05	COUNT	Statistical	Counts the number of cells in a range of cells	=COUNT(E4:E8)
06	LEN	Text	Returns the number of characters in a string text	=LEN(B7)
07	SUMIF	Math & Trig	Adds all the values in a range of cells that meet a specified criteria. =SUMIF(range,criteria,[sum_range])	=SUMIF(D4:D8,">=1000",C4:C8)
08	AVERAGEIF	Statistical	Calculates the average value in a range of cells that meet the specified criteria. =AVERAGEIF(range,criteria,[average_range])	=AVERAGEIF(F4:F8,"Yes",E4:E8)
09	DAYS	Date & Time	Returns the number of days between two dates	=DAYS(D4,C4)
10	NOW	Date & Time	Returns the current system date and time	=NOW()

Numeric Functions

As the name suggests, these functions operate on numeric data. The following table shows some of the common numeric functions.

S/N	FUNCTION	CATEGORY	DESCRIPTION	USAGE
1	ISNUMBER	Information	Returns True if the supplied value is numeric and False if it is not numeric	=ISNUMBER(A3)
2	RAND	Math & Trig	Generates a random number between 0 and 1	=RAND()
3	ROUND	Math & Trig	Rounds off a decimal value to the specified number of decimal points	=ROUND(3.14455,2)
4	MEDIAN	Statistical	Returns the number in the middle of the set of given numbers	=MEDIAN(3,4,5,2,5)
5	PI	Math & Trig	Returns the value of Math Function PI(π)	=PI()
6	POWER	Math & Trig	Returns the result of a number raised to a power. **POWER(number, power)**	=POWER(2,4)
7	MOD	Math & Trig	Returns the Remainder when you divide two numbers	=MOD(10,3)
8	ROMAN	Math & Trig	Converts a number to roman numerals	=ROMAN(1984)

String functions

These basic excel functions are used to manipulate text data. The following table shows some of the common string functions.

| S/N	FUNCTION	CATEGORY	DESCRIPTION	USAGE	COMMENT
1	LEFT	Text	Returns a number of specified characters from the start (left-hand side) of a string	=LEFT("GURU99",4)	Left 4 Characters of "GURU99"
2	RIGHT	Text	Returns a number of specified characters from the end (right-hand side) of a string	=RIGHT("GURU99",2)	Right 2 Characters of "GURU99"
3	MID	Text	Retrieves a number of characters from the middle of a string from a specified start position and length. **=MID (text, start_num, num_chars)**	=MID("GURU99",2,3)	Retrieving Characters 2 to 5
4	ISTEXT	Information	Returns True if the supplied parameter is Text	=ISTEXT(value)	value – The value to check.
5	FIND	Text	Returns the starting position of a text string within another text string. This function is case-sensitive. **=FIND(find_text, within_text, [start_num])**	=FIND("oo","Roofing",1)	Find oo in "Roofing", Result is 2
6	REPLACE	Text	Replaces part of a string with another specified string. **=REPLACE (old_text, start_num, num_chars, new_text)**	=REPLACE("Roofing",2,2,"xx")	Replace "oo" with "xx"

Date Time Functions

These functions are used to manipulate date values. The following table shows some of the common date functions

S/N	FUNCTION	CATEGORY	DESCRIPTION	USAGE
1	DATE	Date & Time	Returns the number that represents the date in excel code	=DATE(2015,2,4)
2	DAYS	Date & Time	Find the number of days between two dates	=DAYS(D6,C6)
3	MONTH	Date & Time	Returns the month from a date value	=MONTH("4/2/2015")
4	MINUTE	Date & Time	Returns the minutes from a time value	=MINUTE("12:31")
5	YEAR	Date & Time	Returns the year from a date value	=YEAR("04/02/2015")

VLOOKUP function

The VLOOKUP function is used to perform a vertical look up in the left most column and return a value in the same row from a column that you specify. Let's explain this in a layman's language. The home supplies budget has a serial number column that uniquely identifies each item in the budget. Suppose you have the item serial number, and you would like to know the item description, you can use the VLOOKUP function. Here is how the VLOOKUP function would work.
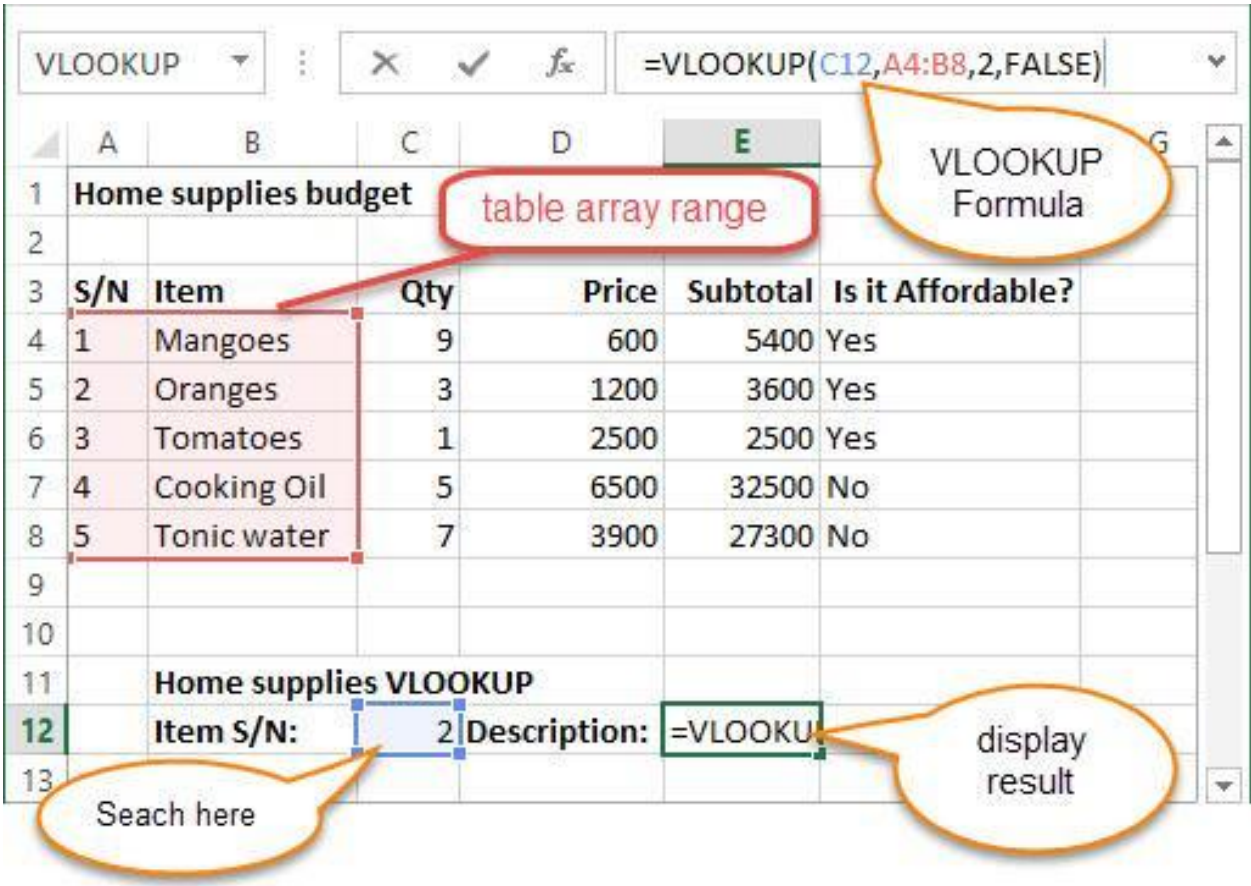

```
=VLOOKUP (C12, A4:B8, 2, FALSE)
```
HERE,

- `"=VLOOKUP"` calls the vertical lookup function
- `"C12"` specifies the value to be looked up in the left most column
- `"A4:B8"` specifies the table array with the data
- `"2"` specifies the column number with the row value to be returned by the VLOOKUP function
- `"FALSE,"` tells the VLOOKUP function that we are looking for an exact match of the supplied look up value

Summary

Excel allows you to manipulate the data using formulas and/or functions. Functions are generally more productive compared to writing formulas. Functions are also more accurate compared to formulas because the margin of making mistakes is very minimum.

Here is a list of important Excel Formula and Function

- SUM function = `=SUM(E4:E8)`

- MIN function = `=MIN(E4:E8)`

- MAX function = `=MAX(E4:E8)`

- AVERAGE function = `=AVERAGE(E4:E8)`

- COUNT function = `=COUNT(E4:E8)`

- DAYS function = `=DAYS(D4,C4)`

- VLOOKUP function = `=VLOOKUP (C12, A4:B8, 2, FALSE)`

- DATE function = `=DATE(2020,2,4)`