### Cell reference in formula

A cell reference refers to a cell or a range of cells on a worksheet and can be used in a formula so that Microsoft Office Excel can find the values or data that you want that formula to calculate.

In one or several formulas, you can use a cell reference to refer to:

- Data from one or more contiguous cells on the worksheet.
- Data contained in different areas of a worksheet.
- Data on other worksheets in the same workbook.

For example:

| | |
|---|---|
| The cell in column A and row 10 | A10 |
| The range of cells in column A and rows 10 through 20 | A10:A20 |
| The range of cells in row 15 and columns B through E | B15:E15 |
| All cells in row 5 | 5:5 |
| All cells in rows 5 through 10 | 5:10 |
| All cells in column H | H:H |
| All cells in columns H through J | H:J |
| The range of cells in columns A through E and rows 10 through 20 | A10:E20 |

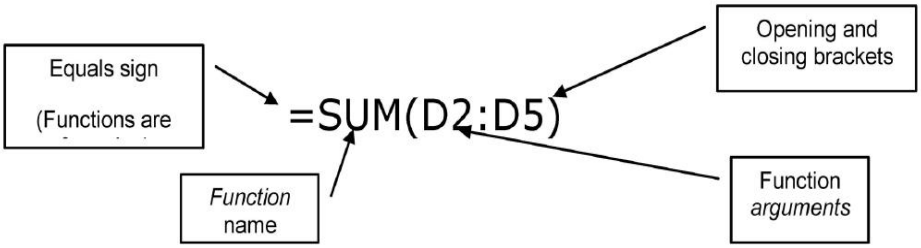
# Microsoft Excel Basic Functions

calculations as well complex. Below I have listed 8 Basic Excel Functions which you need to learn.

1- SUM: It returns the sum of numeric values in a cell. You can refer to the cells where you have values or simply insert the values into the function.

For example:

- **=SUM(A2:A10)** Adds the values in cells A2:10.
- **=SUM(A2:A10, C2:C10)** Adds the values in cells A2:10, as well as cells C2:C10.




## To Greate Sum Function

1. Enter or locate several figures you wish to find the total of.
2. In an empty cell enter the equals sign.
3. Type in the word sum and open a set of brackets.
4. Highlight the figures you wish to total so that a cell range appears after the open bracket.
5. Close the bracket and press return

2- COUNT: It returns the count of numeric values in a cell. You can refer to the cells where you have values or simply insert the values into the function

How to use the `=COUNT` function:

1. Select a cell
2. Type `=COUNT`
3. Double click the **COUNT** command
4. Select a range
5. Hit enter

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | Name | Type 1 | Type 2 | Total stats | | |
| 2 | Mankey | Fighting | | 305 | | |
| 3 | Poliwrath | Water | Fighting | 510 | | |
| 4 | Victreebel | Grass | Poison | 490 | | |
| 5 | Tentacool | Water | Poison | 335 | | |
| 6 | Magneton | Electric | Steel | 465 | | |
| 7 | Dewgong | Water | Ice | 475 | | |
| 8 | Cloyster | Water | Ice | 525 | | |
| 9 | Onix | Rock | Ground | 385 | | |
| 10 | Dragonair | Dragon | | 420 | | |
| 11 | Pidgeotto | Normal | Flying | 349 | | |
| 12 | Rattata | Normal | | 253 | | |
| 13 | Beedrill | Bug | Poison | 395 | | |
| 14 | Doduo | Normal | Flying | 310 | | |
| 15 | Kingler | Water | | 475 | | |
| 16 | Nidoqueen | Poison | Ground | 505 | | |
| 17 | Hitmonchan | Fighting | | 455 | | |
| 18 | Charmeleon | Fire | | 405 | | |
| 19 | Arbok | Poison | | 438 | | |
| 20 | Gastly | Ghost | Poison | 310 | | |
| 21 | Magikarp | Water | | 200 | | |
| 22 | | | | | | |
| 23 | | | | =COUNT(D2:D21 | | |
| 24 | | | | COUNT (value1; [value2]; ...) | | |
| 25 | | | | | | |

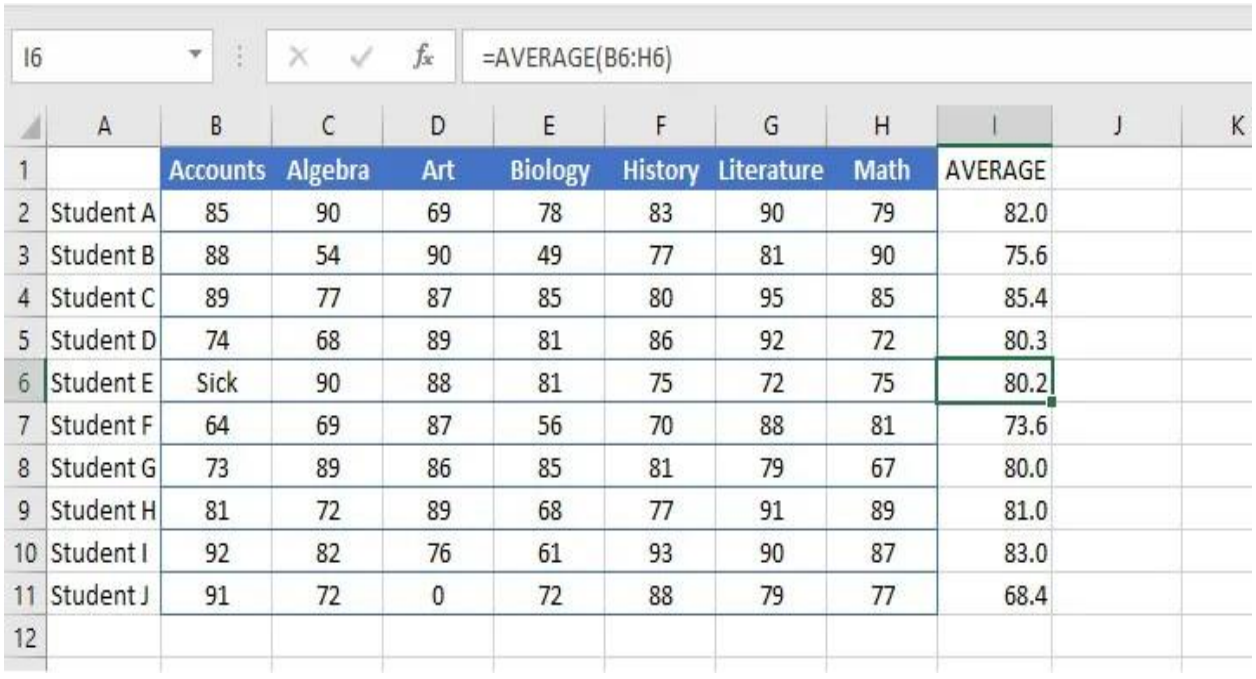
| | A | B | C | D |
|---|---|---|---|---|
| 1 | Name | Type 1 | Type 2 | Total stats |
| 2 | Mankey | Fighting | | 305 |
| 3 | Poliwrath | Water | Fighting | 510 |
| 4 | Victreebel | Grass | Poison | 490 |
| 5 | Tentacool | Water | Poison | 335 |
| 6 | Magneton | Electric | Steel | 465 |
| 7 | Dewgong | Water | Ice | 475 |
| 8 | Cloyster | Water | Ice | 525 |
| 9 | Onix | Rock | Ground | 385 |
| 10 | Dragonair | Dragon | | 420 |
| 11 | Pidgeotto | Normal | Flying | 349 |
| 12 | Rattata | Normal | | 253 |
| 13 | Beedrill | Bug | Poison | 395 |
| 14 | Doduo | Normal | Flying | 310 |
| 15 | Kingler | Water | | 475 |
| 16 | Nidoqueen | Poison | Ground | 505 |
| 17 | Hitmonchan | Fighting | | 455 |
| 18 | Charmeleon | Fire | | 405 |
| 19 | Arbok | Poison | | 438 |
| 20 | Gastly | Ghost | Poison | 310 |
| 21 | Magikarp | Water | | 200 |
| 22 | | | | |
| 23 | | | | 20 |
| 24 | | | | |

3- AVERAGE: It returns the average of numeric values in a cell. You can refer to the cells where you have values or simply insert the values into the function

**The average of (2, 3, 4) is 3.
3 observations (2, 3 and 4)
The sum of the observations (2 + 3 + 4 = 9)
(9 / 3 = 3)
The average is 3

How to use the =AVERAGE function, step by step:

1. Select a cell (I2)
2. Type =AVERAGE
3. Double click the **AVERAGE** command
4. Select a range (B2:H2)
5. Hit enter
6. Next, Fill I2:I11




| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | Accounts | Algebra | Art | Biology | History | Literature | Math | AVERAGE | | |
| 2 | Student A | 85 | 90 | 69 | 78 | 83 | 90 | 79 | 82.0 | | |
| 3 | Student B | 88 | 54 | 90 | 49 | 77 | 81 | 90 | 75.6 | | |
| 4 | Student C | 89 | 77 | 87 | 85 | 80 | 95 | 85 | 85.4 | | |
| 5 | Student D | 74 | 68 | 89 | 81 | 86 | 92 | 72 | 80.3 | | |
| 6 | Student E | Sick | 90 | 88 | 81 | 75 | 72 | 75 | 80.2 | | |
| 7 | Student F | 64 | 69 | 87 | 56 | 70 | 88 | 81 | 73.6 | | |
| 8 | Student G | 73 | 89 | 86 | 85 | 81 | 79 | 67 | 80.0 | | |
| 9 | Student H | 81 | 72 | 89 | 68 | 77 | 91 | 89 | 81.0 | | |
| 10 | Student I | 92 | 82 | 76 | 61 | 93 | 90 | 87 | 83.0 | | |
| 11 | Student J | 91 | 72 | 0 | 72 | 88 | 79 | 77 | 68.4 | | |
| 12 | | | | | | | | | | | |

J6 =AVERAGEA(B6:H6)

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | Accounts | Algebra | Art | Biology | History | Literature | Math | AVERAGE | AVERAGEA | |
| 2 | Student A | 85 | 90 | 69 | 78 | 83 | 90 | 79 | 82.0 | 82.0 | |
| 3 | Student B | 88 | 54 | 90 | 49 | 77 | 81 | 90 | 75.6 | 75.6 | |
| 4 | Student C | 89 | 77 | 87 | 85 | 80 | 95 | 85 | 85.4 | 85.4 | |
| 5 | Student D | 74 | 68 | 89 | 81 | 86 | 92 | 72 | 80.3 | 80.3 | |
| 6 | Student E | Sick | 90 | 88 | 81 | 75 | 72 | 75 | 80.2 | 68.7 | |
| 7 | Student F | 64 | 69 | 87 | 56 | 70 | 88 | 81 | 73.6 | 73.6 | |
| 8 | Student G | 73 | 89 | 86 | 85 | 81 | 79 | 67 | 80.0 | 80.0 | |
| 9 | Student H | 81 | 72 | 89 | 68 | 77 | 91 | 89 | 81.0 | 81.0 | |
| 10 | Student I | 92 | 82 | 76 | 61 | 93 | 90 | 87 | 83.0 | 83.0 | |
| 11 | Student J | 91 | 72 | 0 | 72 | 88 | 79 | 77 | 68.4 | 68.4 | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |

## 4- Max-Min function

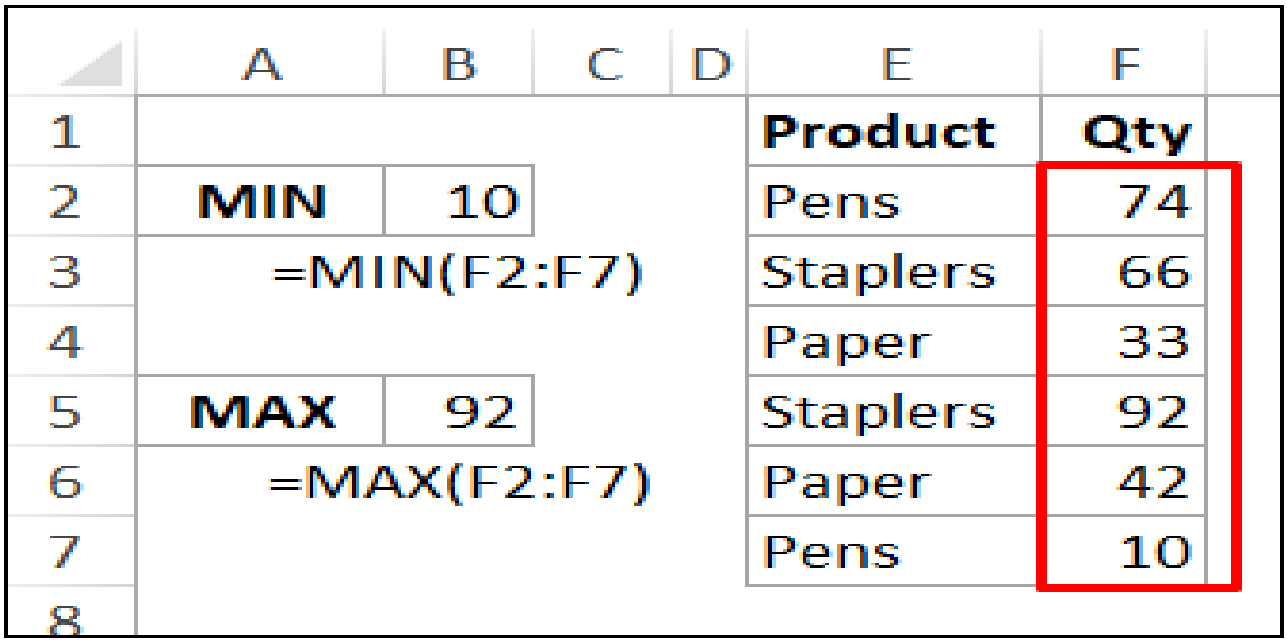
To find the highest and lowest amounts in Excel, use the MAX and MIN function

It is typed =MAX

How to use the `=MAX` function:

1. Select a cell (`G5`)
2. Type `=MAX`
3. Double click the **MAX** command
4. Select a range (`D2:D21`)
5. Hit enter

Let's have a look at an example!



| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | | | | | **Product** | **Qty** |
| 2 | **MIN** | 10 | | | Pens | 74 |
| 3 | =MIN(F2:F7) | | | | Staplers | 66 |
| 4 | | | | | Paper | 33 |
| 5 | **MAX** | 92 | | | Staplers | 92 |
| 6 | =MAX(F2:F7) | | | | Paper | 42 |
| 7 | | | | | Pens | 10 |
| 8 | | | | | | |

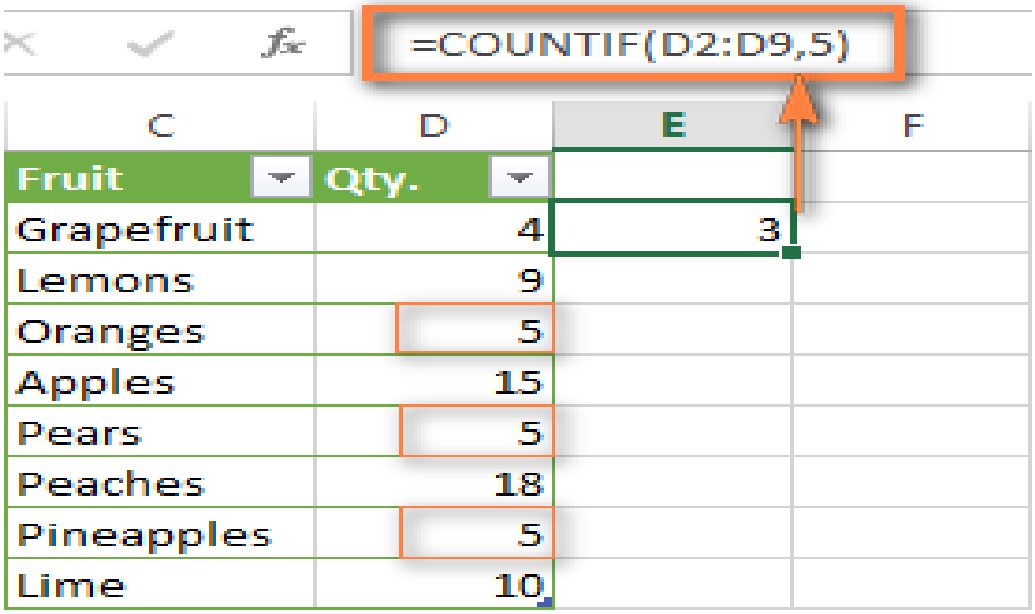
5- COUNTIF Function

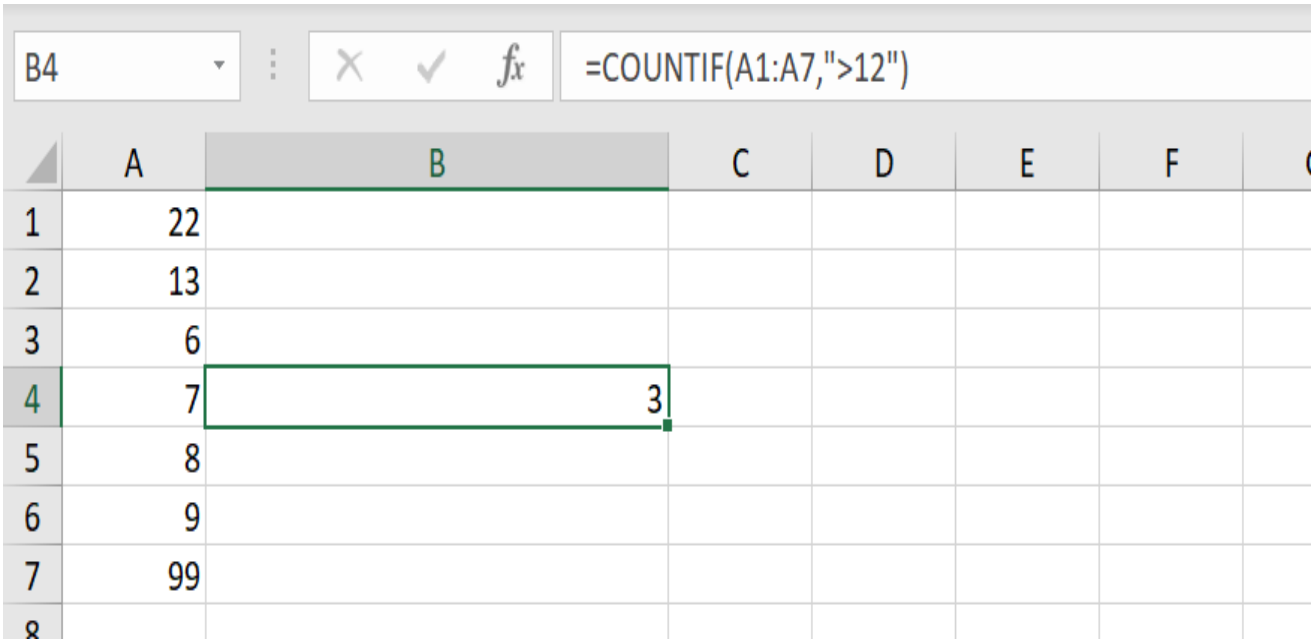
The COUNTIF function is a premade function in Excel, which counts cells as specified.

It is typed =COUNTIF

How to use the `=COUNTIF` function:

1. Select a cell
2. Type `=COUNTIF`
3. Double click the **COUNTIF** command
4. Select a range
5. Type ,
6. Select a cell (the criteria, the value that you want to count)
7. Hit enter


=COUNTIF(D2:D9,5)
C
D
E
F
Fruit
Qty.
Grapefruit
4
3
Lemons
9
Oranges
5
Apples
15
Pears
5
Peaches
18
Pineapples
5
Lime
10


B4
=COUNTIF(A1:A7,">12")
A
B
C
D
E
F
1
22
2
13
3
6
4
7
3
5
8
6
9
7
99

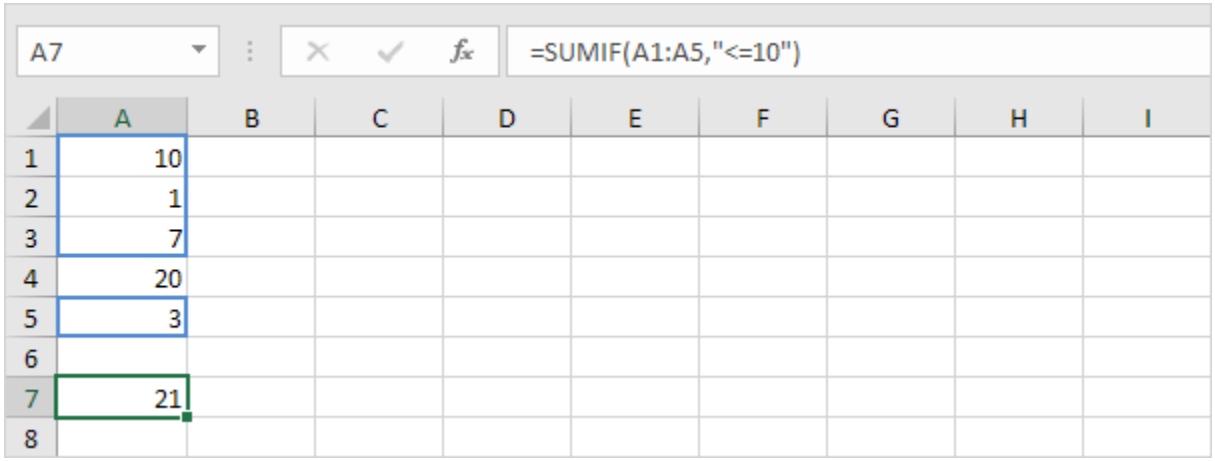
6- Sumif

The powerful SUMIF function in Excel sums cells based on one criteria.

Numeric Criteria

Use the SUMIF function in Excel to sum cells based on numbers that meet specific criteria.

The SUMIF function below (two arguments) sums values in the range A1:A5 that are less than or equal to 10.

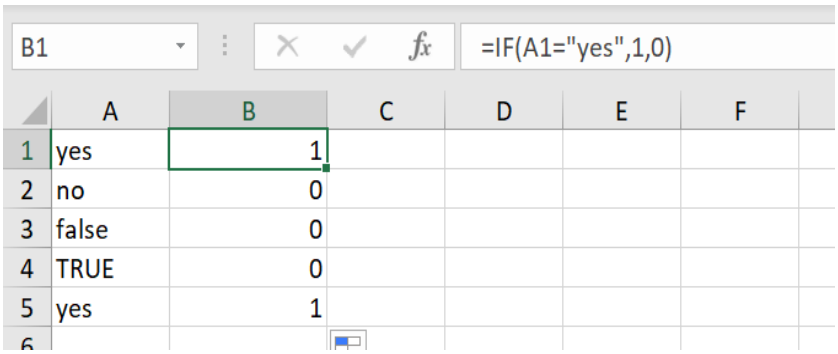



7- IF function

The IF function is one of the most popular functions in Excel, and it allows you to make logical comparisons between a value and what you expect.

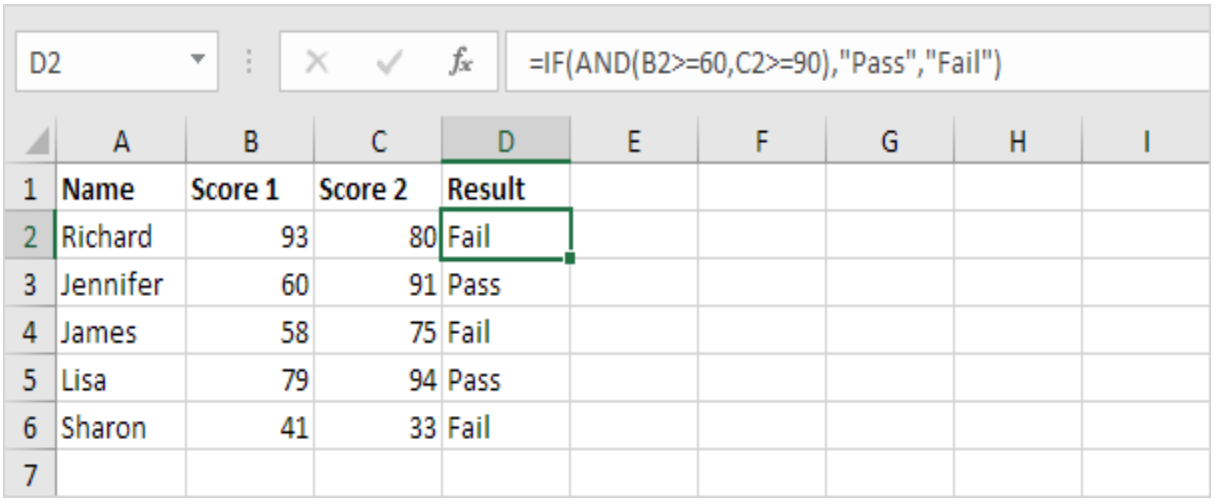
So an IF statement can have two results. The first result is if your comparison is True, the second if your comparison is False.

=IF(C2=”Yes”,1,2)



8- Absolute Value

The ABS function in Excel returns the absolute value of a number. In other words: the ABS function removes the minus sign (-) from a negative number, making it positiv




| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 1 | **Name** | **Score 1** | **Score 2** | **Result** | | | | | |
| 2 | Richard | 93 | 80 | Fail | | | | | |
| 3 | Jennifer | 60 | 91 | Pass | | | | | |
| 4 | James | 58 | 75 | Fail | | | | | |
| 5 | Lisa | 79 | 94 | Pass | | | | | |
| 6 | Sharon | 41 | 33 | Fail | | | | | |
| 7 | | | | | | | | | |

# Charts Introduction

A **chart** is a tool you can use in Excel to **communicate your data graphically**. Charts allow your audience to see the meaning **behind the numbers**, and they make showing **comparisons** and **trends** a lot easier. In this lesson, you will learn how to **insert** charts and **modify** them so that they communicate information effectively.

Excel workbooks can contain **a lot of data**, and that data can often be difficult to interpret. For example, where are the highest and lowest values? Are the numbers increasing or decreasing?

The answers to questions like these can become much clearer when the data is represented as a **chart**. Excel has many different types of charts, so you can choose one that most effectively represents the data.

## Types of Charts

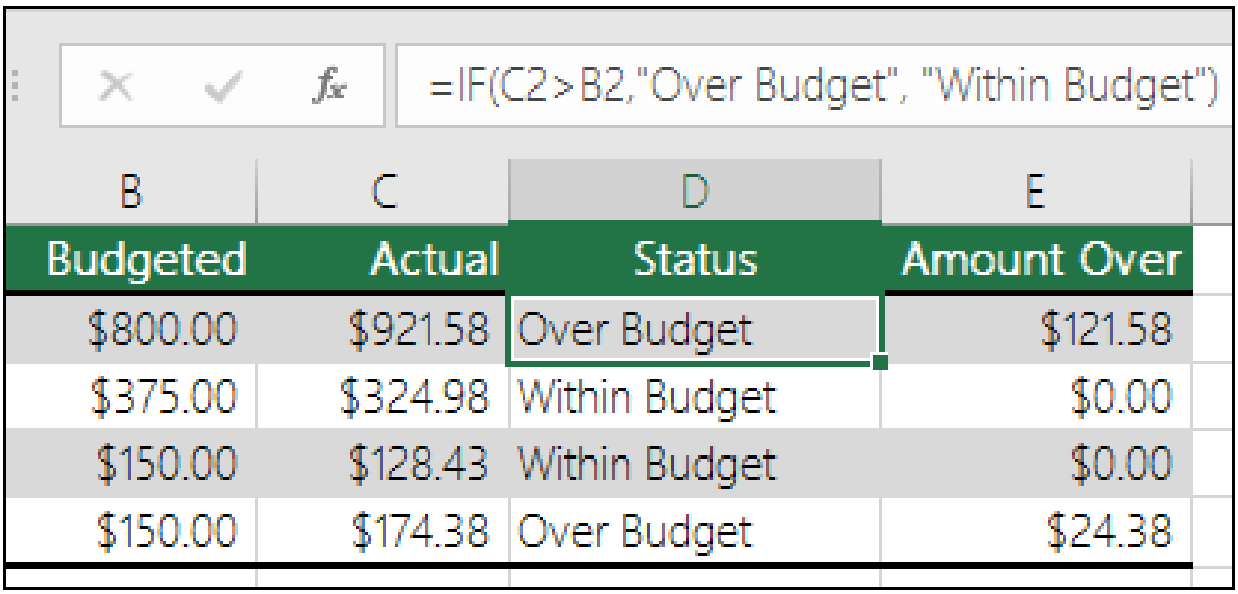
The chart or graph type will depend on the data for which you are going to plot the chart. The most commonly used types include Column Chart, Line Graphs, Pie Chart, Bar Graph, Area Chart, Scatter Graphs, Stock Chart, and Surface Chart, among many others. Lets discuss these chart types, and the situations in which a specific chart type is used.

## Create a Chart

To create a line chart, execute the following steps.

1. Select the range A1:D7.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | Month | Bears | Dolphins | Whales | |
| 2 | Jan | 8 | 150 | 80 | |
| 3 | Feb | 54 | 77 | 54 | |
| 4 | Mar | 93 | 32 | 100 | |
| 5 | Apr | 116 | 11 | 76 | |
| 6 | May | 137 | 6 | 93 | |
| 7 | Jun | 184 | 1 | 72 | |
| 8 | | | | | |


=IF(C2>B2,"Over Budget", "Within Budget")
B
C
D
E
Budgeted
Actual
Status
Amount Over
$800.00
$921.58
Over Budget
$121.58
$375.00
$324.98
Within Budget
$0.00
$150.00
$128.43
Within Budget
$0.00
$150.00
$174.38
Over Budget
$24.38

e.