



Mustaqbal University / College of Engineering & Technology
 Department (Department of Medical Instrumentation Techniques
 Engineering)
 Class 4
 Subject (Computer Applications)
 Lecturer (M.sc.Alaa Khalid)
 2nd term – Lecture No.3 & Lecture Name (formula)

Formulas and Functions

There is a whole new formula bar in Excel 2013 to make entering Formulas and Functions easier.



Formulas

Rules and Syntax

All Formulas or Functions start with an "="

Formulas use these operators (all of these operators can be found on the numeric keypad) and are calculated in the following order:

- "*" **Multiplication**
- "/" **Division**
- "+" **Addition**
- "-" **Subtraction**

Example of a Formula and its Answer:

=5+4*2 would the answer be 18 or 13?

IMPORTANT: The answer would be 13 because the Mathematical Hierarchy states the multiplication and division always occur before addition and subtraction unless parenthesis are used. If parentheses are used, that operation will override the default hierarchy. In other words, if you wish the answer to be 18, the formula must be
 = (5+4)*2.

Syntax

The syntax of a function is generally "=function name(range)" see examples below

- Sum: =SUM(B5:B10)**
- Minimum: =MIN(B5:B10)**
- Maximum: =MAX(B5:B10)**
- Average: =AVERAGE(B5:B10)**



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The AutoSum Tool on the Home tab

Sum a Column

Using the example below:

1. Click in cell **B9** - the cell directly below the data.
2. Click the **AutoSum** tool.
Notice that the cells it thinks you want to add have a marquis, a dotted line, around them.
3. If the cells you wish to add have a marquis around them, simply press Enter or click the **AutoSum** tool again to remove the marquis.

Sum Multiple Columns

4. Select all the cells where you want the totals to appear.

| | A | B | C | D | E | |
|---|-----------|----------|----------|----------|----------|-----------|
| 4 | | January | February | March | April | Total |
| 5 | Ice Cream | \$ 1,000 | \$ 2,000 | \$ 3,000 | \$ 4,000 | \$ 10,000 |
| 6 | Cherries | 900 | 1,900 | 2,900 | 3,900 | 9,600 |
| 7 | Cones | 800 | 1,800 | 2,800 | 3,800 | 9,200 |
| 8 | Nuts | 700 | 1,700 | 2,700 | 3,700 | 8,800 |
| 9 | Total | | | | | |

5. Click the **AutoSum** tool
(i.e. Select **B9:F9** to sum all the rows at once, or **F5:N9** to sum all the columns at once.)

| | A | B | C | D | E | |
|---|-----------|-------------|----------|----------|----------|-----------|
| 4 | | January | February | March | April | Total |
| 5 | Ice Cream | \$ 1,000 | \$ 2,000 | \$ 3,000 | \$ 4,000 | \$ 10,000 |
| 6 | Cherries | 900 | 1,900 | 2,900 | 3,900 | 9,600 |
| 7 | Cones | 800 | 1,800 | 2,800 | 3,800 | 9,200 |
| 8 | Nuts | 700 | 1,700 | 2,700 | 3,700 | 8,800 |
| 9 | Total | =SUM(B5:B8) | | | | |



MIN function - syntax and usage examples in Excel

The MIN function checks your data range and returns the smallest value in the set. Its syntax is the following:

MIN (number1, [number2], ...)

number1, [number2], ... is the series of values from where you want to get a minimum. Number1 is required while [number2] and the following are optional.

There are up to 255 arguments allowed in one function. The arguments can be numbers, cells, arrays of references, and ranges. However, arguments like logical values, text, empty cells are ignored.

Examples of using MIN formula

MIN is one of the easiest functions to apply. Let me prove it to you:

Example 1. Locating the smallest value

Let's say you have some fruits in stock. Your task is to check if you are running out of any.

There are several ways to go:

Case 1: Enter each and every numeral from the Qty in stock column:
 =MIN(366, 476, 398, 982, 354, 534, 408)

Case 2: Reference the cells from the Qty column one by one:
 =MIN(B2,B3,B4,B5,B6,B7,B8)

Case 3: Or simply reference the whole range:
 =MIN(B2:B8)

| | A | B | C | D | E |
|----|-----------|--------------|--------|-----|-----------------------------------|
| 1 | Fruit | Qty in stock | MIN | | |
| 2 | Apple | 366 | Case 1 | | |
| 3 | Mango | 476 | | 354 | =MIN(366,476,398,982,354,534,408) |
| 4 | Orange | 398 | Case 2 | | |
| 5 | Pineapple | 982 | | 354 | =MIN(B2,B3,B4,B5,B6,B7,B8) |
| 6 | Grape | 354 | Case 3 | | |
| 7 | Melon | 534 | | 354 | =MIN(B2:B8) |
| 8 | Banana | 408 | | | |
| 9 | | | | | (366,476,398,982,354,534,408) = |
| 10 | | | | | (B2,B3,B4,B5,B6,B7,B8) = |
| 11 | | | | | (B2:B8) |



Excel MAX function

The MAX function in Excel returns the highest value in a set of data that you specify.

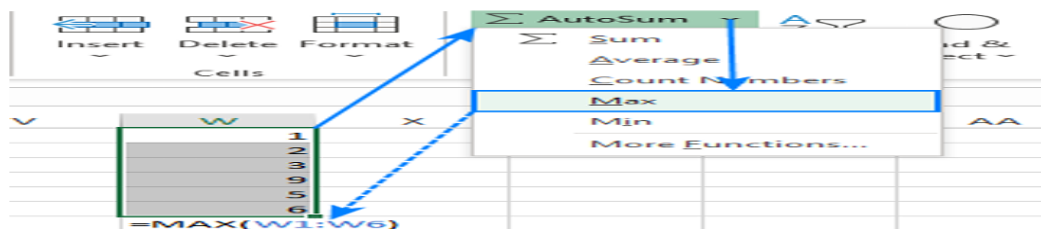
The syntax is as follows:

MAX(number1, [number2], ...)

Where number can be represented by a numeric value, array, named range, a reference to a cell or range containing numbers.

Number1 is required, number2 and subsequent arguments are optional.

The MAX function is available in all versions of Excel for Office 365, Excel 2019, Excel 2016, Excel 2013, Excel 2010, Excel 2007, and lower.



The fastest way to build a Max formula that finds the highest value in a range is this:

1. In a cell, type =MAX(
2. Select a range of numbers using the mouse.
3. Type the closing parenthesis).
4. Press the **Enter** key to complete your formula.

For example, to work out the largest value in the range A1:A6, the formula would go as follows:

| | A | B | C | D | E | F |
|---|---|---|-----------|------------------------------|---|---|
| 1 | 1 | | Max value | =max(A1:A6) | | |
| 2 | 2 | | | MAX(number1, [number2], ...) | | |
| 3 | 3 | | | | | |
| 4 | 9 | | | | | |
| 5 | 5 | | | | | |
| 6 | 6 | | | | | |

5 things to know about MAX function

To successfully use Max formulas your worksheets, please remember these simple facts:

1. In the current versions of Excel, a MAX formula can accept up to 255 arguments.
2. If the arguments do not contain a single number, the MAX function returns zero.
3. If the arguments contain one or more error values, an error is returned.
4. Empty cells are ignored.
5. Logical values and text representations of numbers supplied directly in the list of arguments are processed (TRUE evaluates as 1, FALSE evaluates as 0). In references, logical and text values are ignored.



How to calculate average manually

In math, to find the arithmetic mean of a list of numbers, you need to add up all the values, and then divide the sum by how many numbers there are in the list. In Excel, this can be done using the SUM and COUNT functions, respectively:

SUM(range)/COUNT(range)

For the range of numbers below, the formula goes as follows:

=SUM(B3:B12)/COUNT(B3:B12)

As you can see, the result of the formula exactly matches the average value in the status bar.

| | | Calculate average manually | | | |
|---------|-------|----------------------------|--|---------|--|
| Student | Score | | | Average | |
| Aiden | 1 | | | 5.5 | |
| Ava | 2 | | | | |
| Emma | 3 | | | | |
| Ethan | 4 | | | | |
| Liam | 5 | | | | |
| Lucas | 6 | | | | |
| Mike | 7 | | | | |
| Noah | 8 | | | | |
| Olivia | 9 | | | | |
| Sophia | 10 | | | | |

In practice, you will hardly ever need to do a manual average in your worksheets. However, it may be useful to re-check the result of your average formula in case of doubt.

And now, let's take a look at how you can do average in Excel using the functions specially designed for the purpose.