## Excel Functions (fx)

Excel has prewritten formulas called functions to help simplify making complicated calculations.
A function takes a value or values, performs an operation, and returns a result to a cell. The values that you use with a function are called arguments. All functions begin with an equal sign and include the arguments in parentheses after the function name.
For example, in the function $=\operatorname{SUM}(\mathrm{D} 3: \mathrm{D} 10)$, the function name is SUM and the argument is the range D3:D10.
To start entering functions, click on a cell then click the Paste Function $(f x)$ button on the Toolbar.
Following are some common Excel functions and examples how to use them in a spreadsheet.

SUM
Adds all the numbers in a range of cells.
Syntax:

=SUM(number1,number2, ...)

- Number1, number2, ... are 1 to 30 arguments for which you want the total value or sum.
- The arguments can be numbers, cells or ranges
- If an argument is a range, only numbers in that range are counted. Empty cells, logical values, text, or error values in the range are ignored.


## Examples:

$\operatorname{SUM}(3,2)$ equals 5
If A1 contains 3 and B1 contains 1 , then:
$\operatorname{SUM}(A 1, B 1,2)$ equals 6
If cells A2:E2 contain 5, 15, 30, 40, and 50:
SUM(A2:C2) equals 50
$\operatorname{SUM}(B 2: E 2,15)$ equals 150

## Exercise from Student Files:

Open file "LESSON 6 Class Demo.xls" from the Excel Folder
Select the "Bridge Scores" worksheet
We want to add up all the bridge scores to get a complete total Click cell N16 - type "Total of All Scores" Click cell M16

Click the Paste Function button.
In the Function Category select All
Scroll down the Function Name list And select SUM

| Paste Function |  | ? $\bar{\square}$ |
| :---: | :---: | :---: |
| Function category: Function name: |  |  |
| Most Recently Used | STANDARDIZE |  |
| Financial STDEVA |  |  |
| Date \& Time | STDEVP |  |
| Math \& Trig | STDEVPA |  |
| Statistical | STEYX |  |
| Lookup \& Reference | SUBSTITUTE |  |
| Database | SUBTOTAL |  |
| Text | SLM |  |
| Logical | SUMIF |  |
| Information $\quad \rightarrow \mid$ SUMPRODUCT |  |  |
| SUM(number 1, number2,...) |  |  |
| Adds all the numbers in a range of cells. |  |  |
| ? | $\longrightarrow \mathrm{OK}$ | Cancel |

This opens the Sum Function Formula Palette:


Click/Drag the range of cells to be added by the Sum Function (In this case it is range F7:L14)


After selecting the range click the Collapse/Expand button
This re-opens the Formula Palette - Click OK

## AVERAGE

Returns the average (arithmetic mean) of the arguments.
Syntax: =AVERAGE(number1,number2, ...) where number1, number2, ... are 1 to 30 numeric arguments for which you want the average.
Remarks: The arguments must be either numbers, ranges, or cell references that contain numbers.
If a range or cell reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
Tip: When averaging cells, keep in mind the difference between empty cells and those containing the value zero. Empty cells are not counted, but zero values are.

## Examples:

If range A1:A5 is named Scores and contains the numbers 10, 7, 9, 27, and 2, then:
AVERAGE(A1:A5) equals 11
AVERAGE(Scores) equals 11
AVERAGE(A1:A5, 5) equals 10 or $(10+7+9+27+2+5) / 6=10$
If $\mathrm{C} 1: \mathrm{C} 3$ is named OtherScores and contains the numbers 4,18 , and 7 , then:
AVERAGE(A1:A5, C1:C3) equals 10.5
AVERAGE(Scores, OtherScores) equals 10.5

## Exercise from Student Files:

Use the same Bridge Scores Worksheet from the LESSON 6 Class Demo Workbook. In cell N18 type "Average of All Scores"
Click cell M18 and click the Paste Function button in the Toolbar: $f_{\boldsymbol{x}}$

|  | Paste Function |  | ? 区 |
| :---: | :---: | :---: | :---: |
|  | Function category: | Function nan |  |
| In the Function category list select All | Most Recently Used <br> All <br> Cinamial | $\rightarrow \underset{\text { AVURRAGE }}{\text { AVEDEV }}$ |  |

Scroll down the Function name list and click AVERAGE

In the Formula Palette click the Collapse/Expand button



Click OK in the Formula Palette
Note that the AVERAGE function does not include any blank cells in its calculation

MAX
Returns the largest value in a set of values.
Syntax: =MAX(argument 1,argument2,...)
Argument 1 , argument $2, \ldots$ are 1 to 30 numbers, ranges or cell references for which you want to find the maximum value.

- If an argument is a range or cell reference, only numbers in that range or reference are used. Empty cells, logical values, or text in the array or reference are ignored.
- If the arguments contain no numbers, MAX returns 0 (zero).


## Examples:

If A1:A5 contains the numbers $10,7,9,27$, and 2 , then:
MAX(A1:A5) equals 27
MAX(A1:A5,30) equals 30

## MIN

Same as MAX but returns the smallest value in a set of values.
Syntax: =MIN(argument1, argument2,...)
Examples:
If A1:A5 contains the numbers $10,7,9,27$, and 2 , then:
MIN(A1:A5) equals 2
MAX(A1:A5,1) equals 1
Exercise from Student Files:
Use the same Bridge Scores Worksheet from the LESSON 6 Class Demo Workbook. In cell N20 type "Highest Score"; in cell N22 type "Lowest Score"

Click cell M20 - click the Paste Function button in the Toolbar:


In the Formula Palette click the Collapse/Expand button


Click/Drag the range of cells (F7:L14) that
=MAX(M18:M19) contain the bridge scores.

Click the Collapse/Expand button


In the Formula Palette click OK
 add the MIN function to find the lowest bridge score !!

## IF

Returns one value if a condition you specify evaluates to TRUE and another value if it evaluates to FALSE. Use IF to conduct conditional tests on values and formulas.

## Syntax

$=I F($ Logical test, Value if true, Value if false)
Logical_test is any value or expression that can be evaluated to be TRUE or FALSE.

- Examples of Logical tests on cell $\mathrm{A} 1: \mathrm{A} 1=10, \mathrm{~A} 1>=90$ (A1 greater than or equal to 90 ), A1="Smith"
Value_if_true is the value that is returned if logical_test is TRUE. Value_if_true can be another formula or text within quotation marks.
Value_if_false is the value that is returned if logical_test is FALSE. Value_if_false can be another formula or text contained within quotation marks.


## Remarks

- . Up to seven IF functions can be nested as Value_if_true and Value_if_false arguments to construct more elaborate tests. See the following last example.


## Examples

In the following example, if the value in cell A10 is 100, then logical_test is TRUE, and the total value for the range B5:B15 is calculated and placed in the cell with the IF function.
Otherwise, logical_test is FALSE, and zero is returned to the cell that contains the IF function. $\operatorname{IF}(\mathrm{A} 10=100, \mathrm{SUM}(\mathrm{B} 5: \mathrm{B} 15), 0)$

Value if true can be text. Suppose an expense worksheet contains in B2:B4 the following data for "Actual Expenses" for January, February, and March: 1500, 500, 500. C2:C4 contains the following data for "Budgeted Expenses" for the same periods: 900, 900, 925.
You can write a formula to check whether you are over budget for a particular month, generating text for a message with the following formulas:
IF(B2>C2,"Over Budget","OK") equals "Over Budget"
IF(B3>C3,"Over Budget","OK") equals "OK"
Suppose you want to assign letter grades to numbers referenced by the name AverageScore. See the following table:

| If AverageScore is |  | Then return |
| :--- | :--- | :--- |
| Greater than 89 |  | A |
| From 80 to 89 |  | B |
| From 70 to 79 |  | C |
| From 60 to 69 |  | D |
| Less than 60 |  | F |

You can use the following nested IF function:
IF(AverageScore>89,"A",IF(AverageScore>79,"B",IF(AverageScore>69, "C",
IF(AverageScore>59,"D","F"))))
In the preceding example, the second IF statement is also the value_if_false argument to the first IF statement. Similarly, the third IF statement is the value_if_false argument to the second IF statement. For example, if the first logical_test (Average>89) is TRUE, "A" is returned. If the first logical_test is FALSE, the second IF statement is evaluated, and so on.

## Exercise from Student Files:

Open LESSON 6 Class Demo - select the Checking Account Worksheet Using the IF function, we will add a warning statement if the Checking Account is overdrawn.

Click cell $\mathbf{I 9}$ - click the Paste Function button in the Toolbar:

```\(f_{x}\)
```



In the Logical test window type $\mathbf{E 9 > 0}$ (If cell E9, the account balance, is greater than zero)


Note: The quotation marks are used to indicate text to be entered in the cell. Two quotation marks with nothing between indicates no text, resulting in a blank cell.

Copy the formula using the Fill Handle from cell I9 to cell I32
To make the warning message more noticeable, select column I and change the font to Bold with a Red color.

If done properly, you should see a warning message in cell I24.

## Excel Lessons not covered in the Student Manual

## Copying a Worksheet to another sheet or Workbook

 (In this example you will copy the "ADD" Worksheet from the "LESSON 1" Workbook to the "LESSON 2" Workbook 1. Open the Excel Student Files: LESSON 1 Spreadsheet and LESSON 2: Insert Rows and Columns2. In the Window Menu select the "LESSON 1 " file
3. Click Edit - Click Move or Copy Sheet

4. Click down arrow in To book: window

5. Select the Workbook (LESSON 2 ) you want to copy the sheet to $\qquad$ LESSON 1 Spreadsheet. $\times$ lis
LESSON 2 Insert Rows \& Columns
6. Check box for Create a Copy (avoids deleting file from original Workbook) $\qquad$ Greate a copy


Password protecting an Excel File (This protects your Excel files from being opened and viewed by anyone using your computer)

- Open File - "LESSON 8 Protecting Spreadsheet"
- Click File - click Save As -- This opens the Save As dialog box:

- Click Tools
$\qquad$
- Click General Options


