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EXCEL FORMULAS AND FUNCTIONS:FROM BASIC LEVEL

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# Introduction

Microsoft Excel enables users to format, organize and calculate data in a spreadsheet. By organizing data using software like Excel, data analysts and other users can make information easier to view as data is added or changed. Excel contains a large number of boxes called cells that are ordered in rows and columns.

# Basic Terms in Excel

There are two basic ways to perform calculations in Excel: [Formulas and Functions](https://corporatefinanceinstitute.com/resources/excel/formula-vs-function/).

# 1. Formulas

In Excel, a formula is an expression that operates on values in a range of cells or a cell. For example, =A1+A2+A3, which finds the sum of the range of values from cell A1 to cell A3.

# 2. Functions

Functions are predefined formulas in Excel. They eliminate laborious manual entry of formulas while giving them human-friendly names. For example: =SUM(A1:A3). The function sums all the values from A1 to A3

# . Basic Excel Formulas For Your Workflow

Since you’re now able to insert your preferred formulas and function correctly, let’s check some fundamental Excel functions to get you started.

## 2.1 SUM

The SUM function] is the first must-know formula in Excel. It usually aggregates values from a selection of columns or rows from your selected range.

**=SUM(*number1*, [number2], …)**

Example:

**=SUM(B2:G2)** – A simple selection that sums the values of a row.

**=SUM(A2:A8)** – A simple selection that sums the values of a column.

**=SUM(A2:A7, A9, A12:A15)** – A sophisticated collection that sums values from range A2 to A7, skips A8, adds A9, jumps A10 and A11, then finally adds from A12 to A15.

**=SUM(A2:A8)/20** – Shows you can also turn your function into a formula.

## 2.2 AVERAGE

The [AVERAGE function](https://corporatefinanceinstitute.com/resources/excel/average-excel-function/) should remind you of simple averages of data, such as the average number of shareholders in a given shareholding pool.

**=AVERAGE(*number1*, [number2], …)**

Example:

**=AVERAGE(B2:B11)** – Shows a simple average, also similar to (SUM(B2:B11)/10)

## 2.3 COUNT

The COUNT function counts all cells in a given range that contain only numeric values.

**=COUNT(*value1, [value2], …*)**

Example:

**COUNT(A**:**A)** – Counts all values that are numerical in A column. However, you must adjust the range inside the formula to count rows.

**COUNT(A1:C1)** – Now it can count rows.

## 2.4 COUNTA

Like the COUNT function, COUNTA counts all cells in a given rage. However, it counts all cells regardless of type. That is, unlike COUNT that only counts numerics, it also counts dates, times, strings, logical values, errors, empty string, or text.

**=COUNTA(*value1, [value2], …*)**

Example:

**COUNTA(C2:C13)** – Counts rows 2 to 13 in column C regardless of type. However, like COUNT, you can’t use the same formula to count rows. You must make an adjustment to the selection inside the brackets – for example, **COUNTA(C2:H2)**will count columns C to H

## 2.5 IF

The [IF function](https://corporatefinanceinstitute.com/resources/excel/excel-if-statement-guide/) is often used when you want to sort your data according to a given logic. The best part of the IF formula is that you can embed formulas and functions in it.

**=IF(*logical\_test, [value\_if\_true], [value\_if\_false]*)**

Example:

**=IF(C2<D3,“TRUE”,”FALSE”)** – Checks if the value at C3 is less than the value at D3. If the logic is true, let the cell value be TRUE, otherwise, FALSE

**=IF(SUM(C1:C10) > SUM(D1:D10), SUM(C1:C10), SUM(D1:D10))** – An example of a complex IF statement. First, it sums C1 to C10 and D1 to D10, then it compares the sum. If the sum of C1 to C10 is greater than the sum of D1 to D10, then it makes the value of a cell equal to the sum of C1 to C10.

## 2.6 MAX & MIN

The [MAX](https://corporatefinanceinstitute.com/resources/excel/max-function/) and [MIN](https://corporatefinanceinstitute.com/resources/excel/min-function/) functions help in finding the maximum number and the minimum number in a range of values.

**=MIN(*number1*, [number2], …)**

Example:

**=MIN(B2:C11)** – Finds the minimum number between column B from B2 and column C from C2 to row 11 in both columns B and C.

**=MAX(*number1*, [number2], …)**

Example:

**=MAX(B2:C11)** – Similarly, it finds the maximum number between column B from B2 and column C from C2 to row 11 in both columns B and C.

## 2.7 VLOOKUP and HLOOKUP

VLOOKUP allows you to search a data range that is set up vertically. HLOOKUP is the exact same function, but looks up data that has been formatted by rows instead of columns. LOOKUP and related functions are commonly used for business analytics in Excel as a way of slicing and dicing data for analysis.

The formula of VLOOKUP=VLOOKUP (lookup\_value, table\_array, col\_index\_number, ), and the formula of HLOOKUP is =HLOOKUP (lookup\_value, table\_array, row\_index\_number, ). There is only one difference between these formulas: row and column.

## 2.8 COUNTIF AND COUNTIFS

Use COUNTIF, one of the statistical functions, to count the number of cells that meet a criterion; for example, to count the number of times a particular city.

The difference between COUNTIF and COUNTIFS is that COUNTIF is designed for counting cells with a single condition in one range, whereas COUNTIFS can evaluate different criteria in the same or different ranges. When doing financial analysis, COUNTIF helps in doing a quick analysis.

The COUNTIFS function is a premade function in Excel, which counts cells in a range based on one or more true or false condition. It is typed =COUNTIFS : =COUNTIFS(criteria\_range1, criteria1, [criteria\_range2, criteria2], ...)

## 2.9 SUMIF and AVERAGEIF

Sumif

So you have found the number of records of a particular type but what if you now need to find the total of this information.  For example, you have found the number of people in each department by using COUNTIF and now you need to find the total salary for them you would use SUMIF.

Structure

=SUMIF(range, criteria, sum range)

The first 2 parts of the function are the same as for the COUNTIF function. The sum range is the actual range of cells to sum, the range is the range of cells you want to be evaluated and the criteria is the condition that defines the cells to be counted.

AVERAGEIF

You have found the number of records and the total of the data but now you want to find the average instead.  For example, you need to find the average salary for the people in each department then you would use AVERAGEIF.

Structure

=AVERAGEIF(range, criteria, sum range)

The first 2 parts of the function are the same as for the COUNTIF and SUMIF functions already described. The average range is the actual range of cells to average, the range is the range of cells you want to be evaluated and the criteria is the condition that defines the cells to be counted.

## 2.10 SUMIFS and AVERAGIFS

The SUMIFS function is a premade function in Excel, which calculates the sum of a range based on one or more true or false condition. It is typed =SUMIFS : =SUMIFS(sum\_range, criteria\_range1, criteria1, [criteria\_range2, criteria2] ...)

The AVERAGEIFS function is a premade function in Excel, which calculates the average of a range based on one or more true or false condition. It is typed =AVERAGEIFS : =AVERAGEIFS(average\_range, criteria\_range1, criteria1, ...)

# 3.PIVOT TABLE

Select a cell in the source data or table range. Go to Insert > PivotTable. Choose where you want the PivotTable to be placed. Select Insert on new sheet to place the PivotTable in a new worksheet or select the cell where you want the new PivotTable placed in the Destination field. Select Insert. You can use a PivotTable to summarize, analyze, explore, and present summary data.

# 4.PIVOT CHART

Create a chart from a PivotTable · Select a cell in your table. · Select Insert and choose PivotChart. · Select a chart. · Select OK. PivotCharts provide graphical representations of the data in their associated PivotTables. PivotCharts are also interactive. When you create a PivotChart, the PivotChart Filter Pane appears. You can use this filter pane to sort and filter the PivotChart's underlying data. To add a slicer, click a cell in your PivotTable, and the PIVOTTABLE TOOLS tab appears. Click ANALYZE, click Insert Slicer. The Insert Slicer dialog box has options for each field in the PivotTable. Check the fields you want to slice the PivotTable with, and click OK.

# CONCLUSION

Microsoft Excel is a powerful and easy-to-use application for data analysis and reporting. In this post, we have learned the importance of basic Excel formulas and how they provide us extra ability to perform complex calculations. Furthermore, we have learned about various ways of adding formulas to worksheets and looked in detail at the essential basic Excel formulas.

# REFERENCES

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