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Teachers and Educators



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# Data Analysis Using Formulas

## Statistical Functions

WEEK 3

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# Data Analysis Using Formulas

## Basic Statistical Functions

In this chapter, and not only in this chapter, we will focus only on the six basic aggregation functions (SUM, AVERAGE, COUNT, COUNTA, MIN and MAX) using both basic functions and functions with conditions. We will also learn how to replace functions with conditions using array formulas. We will use both classic cell addressing and defined names as parameters of the functions mentioned above.

The meaning of functions mentioned above is described in the following table:

*Table 1 Basic statistical functions*

Function	Meaning
SUM(number1,[number2],...)	Returns the sum of the numbers
AVERAGE(number1,[number2],...)	Returns the average of the numbers
COUNT(number1,[number2],...)	Returns the number of cells that contain numbers
COUNTA(value1,[value2],...)	Returns the number of cells that are not empty
MIN(number1,[number2],...)	Returns the minimum number from a set of numbers
MAX(number1,[number2],...)	Returns the maximum number from a set of numbers

As you can see from the table above, all functions work with numbers, the only exception is the COUNTA function, which works with values of arbitrary data types. The first argument for all functions is mandatory, any others are optional. Individual arguments can be numbers or names, arrays or references that contain numbers.



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## Statistical Functions with a Condition

The statistical functions mentioned in the previous chapter (with the exception of the COUNTA function) also have their equivalents for specifying the condition that should apply during aggregation. The name of the function with a condition is extended with the suffix IF or IFS with the following meaning:

- **FunctionNameIF** – aggregation function with one condition (e.g. SUMIF).
- **FunctionNameIFS** – aggregation function with one or more conditions (e.g. SUMIFS).

The following table provides an overview of basic statistical functions and their equivalents with conditions:

*Table 2 Basic statistical functions and their equivalents with conditions*

Basic function	Function with one condition	Function with one or more condition
SUM	SUMIF	SUMIFS
AVERAGE	AVERAGEIF	AVERAGEIFS
COUNT	COUNTIF	COUNTIFS
MIN	<i>Doesn't exist</i>	MINIFS
MAX	<i>Doesn't exist</i>	MAXIFS

Functions with one condition have the following syntax (with a slight difference for the COUNTIF function):

**FunctionNameIF(criteria range,;criteria,[range])**

- **Criteria range:** Required. This is the range of cells evaluated using the given criteria.
- **Criteria:** Required. It is a criteria expressed as a number, expression, cell reference, text, or function that defines the cells to be summed. Examples of criteria can be e.g.



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32, ">32", B5, "3?", "apple\*", "\*~?", or TODAY(). Text criteria or criteria containing logical or mathematical symbols must be enclosed in quotation marks ("). Numeric criteria do not require quotation marks.

- **Range:** Optional. The cells to be summed if you want to sum the cells not specified in the criteria range argument.

Functions with one or more conditions have slightly different syntax than functions with one condition (again with a slight difference for the COUNTIFS function):

**FunctionNameIFS(range, criteria range1,criteria1,[criteria range2,criteria2],...)**

- **Range:** Required. The cells to be summed.
- **Criteria range1:** Required. This is the range of cells evaluated using the criteria 1.
- **Criteria1:** Required. It is a criteria for criteria range1.
- **Criteria range2, Criteria2:** Optional. Other ranges and their associated criteria. You can enter up to 127 range/criteria pairs.



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