

# Basic Excel Functions (Excel 2016)

Excel functions (can be found under the “Formulas” ribbon) are classified based on the type of the formula.

The following are the most commonly used types of Excel functions:

- Statistical – perform calculations on a group of cells in a worksheet related to statistics and probability
- Math – apply mathematical formulas to allow basic calculation features. For example, summing up several numbers together
- Logical – test a cell to determine TRUE or FALSE condition
- Lookup & Reference – find the information for a certain cell using cross reference between different data sets (arrays/range of data)
- Financial – provide the calculations related to financial and accounting terms

This example spreadsheet will be used to explain the functions used:

Gradebook								
Student	Quiz 1	Quiz 2	Quiz 3	Total	AVG	Average after a 3 mark bonus when student's Quiz 1 mark is greater than 85	Grade	Rank
Alex	85	75	64	224	74.67	74.67	C	4
Kate	33	98	88	219	73	73.00	C	5
Anjali	94	45	54	193	64.33	67.33	D	6
Arnav	87	65	65	217	72.33	75.33	C	3
Chang	53	35	87	175	58.33	58.33	F	7
Francisco	76	85	77	238	79.33	79.33	C	2
Eun Jung	79	76	92	247	82.33	82.33	B	1
Min	33	35	54	175	58.33	58.33		
Max	94	98	92	247	82.33	82.33		
AVG per quiz	72.43	68.43	75.29	216.14	72.05	72.90		

## Statistical

The most commonly used statistical functions include MIN(), MAX(), AVERAGE() and COUNT().

MIN(number1, [number2, ... number n]) OR MIN(range of cells)

The general formula is the same for all statistical functions.

**EXAMPLE:** =COUNT(B3, C4, D3, E3); =MAX(B3:B9)

=AVERAGE(B3:B11)

## Math

Math functions include functions such as sum(), sumif()

SUM(number1, [number2, ... number n]) OR SUM(cell1:cell2)

number1, number2 – list of numbers or cels

cell1:cell2 – a range of cells

**EXAMPLE:** =SUM(12,43,56,44,32)

=SUM(B3:D3)

SUMIF(range, criteria, [sum range])

range – range of cells to which apply the criteria against

criteria - the criteria to determine which cells to add

sum\_range – optional, the range of cells to sum together

	A	B	C	D	E	F
1	Student	Quiz 1	Quiz 2	Quiz 3	Total	Average per student
2	Alex	85	75	64	224	74.67
3	Kate	33	98	88	219	73
4	Anjali	94	45	54	193	64.33
5	Arnav	87	65	65	217	72.33
6	Chang	53	35	87	175	58.33
7	Francisco	76	85	77	238	79.33
8	Eun Jung	79	76	92	247	82.33
9						
<b>EXAMPLE:</b> 10	find the total mark of a student who has the max average	=SUMIF(F2:F8,F10,E2:E8)			MAX Average	82.33

Result: \_\_\_\_ (fill in you answer)

## Logical

The most common example of logical functions is if()

IF(condition, value if true, [value if false])

Condition – the value to test

value\_if\_true – the value to return if the condition is TRUE

value\_if\_false – optional, the value to return if the condition is FALSE

**Example:** =IF(B3>85, F3+3, F3) - give 3 bonus marks if Quiz1 mark was greater than 85

## Lookup & Reference

VLOOKUP is used for vertical lookup of a certain value

VLOOKUP( value, table, index\_number, [approximate\_match] )

- value - the value to search for
- table - two or more columns of data
- index\_number - the column number in table from which the matching value must be returned
- approximate\_match - optional. Enter FALSE to find an exact match. Enter TRUE to find an approximate match. If this parameter is omitted, TRUE is the default

**EXAMPLE:** =VLOOKUP(F3,\$D\$15:\$E\$19,2)

## Compatibility

RANK is used to determine the rank of a number in a range of data.

RANK(number, ref, [order])

- number – the value for which you want to determine the rank
- ref – an array of range of numbers
- order – optional. Specifies how to rank numbers

**EXAMPLE:** =RANK(G3,\$G\$3:\$G\$9)

The complete spreadsheet worksheet with formulas:

	A	B	C	D	E	F	G	H	I
1	Gradebook								
2	Student	Quiz 1	Quiz 2	Quiz 3	Total	Average per student	Average after a 3 mark bonus when student's Quiz 1 mark is greater than 85	Grade	Rank
3	Alex	85	75	64	=SUM(B3:D3)	=AVERAGE(B3:D3)	=IF(B3>85, F3+3, F3)	=VLOOKUP(F3,\$D\$15:\$E\$19,2)	=RANK(G3,\$G\$3:\$G\$9)
4	Kate	33	98	88					
5	Anjali	94	45	54					
6	Arnav	87	65	65					
7	Chang	53	35	87					
8	Francisco	76	85	77					
9	Eun Jung	79	76	92					
10									
11	Min	=MIN(B3:B9)							
12	Max	=MAX(B3:B9)							
13	AVG per quiz	=AVERAGE(B3:B9)							
14									
15	find the total mark of a student who has the max average	=SUMIF(F3:F9,F12,E3:E9)		0	F				
16				60	D				
17				70	C				
18				80	B				
19				90	A				



## Financial

PMT function returns the payment amount for a loan based on an interest rate and a constant payment schedule

$\text{PMT}(\text{interest\_rate}, \text{number\_payments}, \text{PV}, [\text{FV}], [\text{Type}] )$

Interest\_rate – the interest rate for the loan.

number\_payments – the number of payments for the loan.

PV – present value

FV – future value

Type – optional. 0 for payments due at the end of the period, 1 for payments due at the beginning of the period

**EXAMPLE:**  $=\text{PMT}(7.5\%/12, 2*12, 5000, 0, 1)$

**Result:** -\$223.60

## References

TechOnTheNet.com (n.d.) *MS Excel: Formulas and Functions - Listed by Category*. Retrieved from <https://www.techonthenet.com/excel/formulas/>

Brun, D., Brun, L. (n.d.) *Excel Function Guide*. Retrieved from <https://exceljet.net/excel-functions>