

Spreadsheet (Excel, LibreOffice, etc.) Functions*

Mehmet Hakan Satman (PH.D.)

Istanbul University, Faculty of Economics, Department of Econometrics

December 2, 2025

Contents

1	Rounding Functions	3
1.1	ROUND	3
1.2	ROUNDUP	4
1.3	ROUNDDOWN	4
1.4	INT	4
2	Mathematical Functions	5
2.1	SIGN	5
2.2	ABS	5
2.3	POWER	5
2.4	LOG	6
2.5	LN	6
2.6	LOG10	6
2.7	EXP	7
2.8	SQRT	7
2.9	PI	7
2.10	SIN	7
2.11	COS	8
2.12	RADIANS	8
2.13	DEGREES	8
2.14	ISNUMBER	8
2.15	ISEVEN	9
2.16	ISODD	9
2.17	ISBLANK	9

*This document is prepared for educational purposes only in the information technology course series at Istanbul University, Faculty of Economics. The content includes formulas and functions commonly used in spreadsheet software such as Microsoft Excel, LibreOffice, and Google Sheets, etc. The notes are for those who already participated in the related courses. The source code of this content is available at <https://github.com/jbytecode/sampledbs> in L^AT_EX format.

2.18	BASE	10
2.19	MOD	10
2.20	ROMAN	10
2.21	Function Composition	10
2.21.1	Example 1	10
2.21.2	Example 2	11
2.21.3	Example 3	11
2.21.4	Example 4	11
3	Statistical Functions	11
3.1	MIN	11
3.2	MAX	11
3.3	VAR	12
3.4	STDEV	12
3.5	SUM	12
3.6	PRODUCT	13
3.7	AVERAGE	13
3.8	COUNT	13
3.9	MEDIAN	13
3.10	PERCENTILE	14
3.11	QUARTILE	15
3.12	SKEW	16
3.13	CORREL	17
3.14	FACT	17
3.15	COMBIN	17
3.16	SUMSQ	18
4	Logical Functions	18
4.1	AND	18
4.2	OR	18
4.3	NOT	19
4.4	XOR	19
4.5	IF	19
4.5.1	IF...ELSEIF...ELSEIF...ELSE	20
4.5.2	How many real roots?	21
4.5.3	How is the weather outside?	21
5	Random Numbers	22
5.1	RAND	22
5.2	RANDBETWEEN	22
6	Date and Time Functions	22
6.1	NOW	22
6.2	YEAR	22
6.3	MONTH	23
6.4	DAY	23

6.5	HOUR	23
6.6	MINUTE	23
6.7	SECOND	23
7	String Functions	24
7.1	CHAR	24
7.2	CODE	24
7.3	UNICODE	24
7.4	UNICHAR	24
7.5	LOWER	24
7.6	UPPER	25
7.7	CONCATENATE	25
7.8	LEFT	25
7.9	RIGHT	25
7.10	MID	26
7.11	LEN	26
7.12	ISTEXT	26
7.13	ISNONTEXT	26
7.14	REPLACE	27
7.15	SEARCH	27
7.16	VLOOKUP	27
8	Visual Basic for Applications (VBA)	28
8.1	times function	28
8.2	factorial function	29
8.3	paraboladelta function	29
8.4	numberofroots function	29
8.5	findminimum function	30

1 Rounding Functions

1.1 ROUND

	A	B	C	D	E	F
1		=ROUND(1.1234,3)				
2						

1.123

	A	B	C	D	E	F
1		=ROUND(1.1237,3)				
2						

1.124

1.2 ROUNDUP

	A	B	C	D	E	F
1		=ROUNDUP(1.1234,3)				
2						

1.124

	A	B	C	D	E	F
1		=ROUNDUP(1.1237,3)				
2						

1.124

1.3 ROUNDDOWN

	A	B	C	D	E	F
1		=ROUNDDOWN(1.1234,3)				
2						

1.123

	A	B	C	D	E	F
1		=ROUNDDOWN(1.1237,3)				
2						

1.123

1.4 INT

	A	B	C	D	E	F
1		=INT(1.1234)				
2		=INT(100.99)				

1
100

2 Mathematical Functions

2.1 SIGN

	A	B	C	D	E	F
1		=SIGN(16)				
2						

1

	A	B	C	D	E	F
1		=SIGN(-8)				
2						

-1

	A	B	C	D	E	F
1		=SIGN(0)				
2						

0

2.2 ABS

	A	B	C	D	E	F
1		=ABS(-25)				
2						

25

	A	B	C	D	E	F
1		=ABS(25)				
2						

25

2.3 POWER

	A	B	C	D	E	F
1		=POWER(2; 3)				
2						

8

	A	B	C	D	E	F
1		=POWER(10; 4)				
2						

10000

2.4 LOG

	A	B	C	D	E	F
1		=LOG(1000)				
2						

3

	A	B	C	D	E	F
1		=LOG(8; 2)				
2						

3

2.5 LN

	A	B	C	D	E	F
1		=LN(2,71828)				
2						

0.999999327347282

	A	B	C	D	E	F
1		=LN(EXP(1))				
2						

1

2.6 LOG10

	A	B	C	D	E	F
1		=LOG10(1000))				
2						

3

2.7 EXP

$$EXP(x) = e^x$$

	A	B	C	D	E	F
1		=EXP(1)				
2						

2.71828182845905

	A	B	C	D	E	F
1		=LN(EXP(2))				
2						

2

2.8 SQRT

	A	B	C	D	E	F
1		=SQRT(16)				
2						

4

2.9 PI

	A	B	C	D	E	F
1		=PI()				
2						

3.14159265358979

2.10 SIN

	A	B	C	D	E	F
1		=SIN(PI()/2)				
2						

1

2.11 COS

	A	B	C	D	E	F
1		=COS(2 * PI())				
2						

1

2.12 RADIANS

	A	B	C	D	E	F
1		=RADIANS(90)				
2						

1.5707963267949

2.13 DEGREES

	A	B	C	D	E	F
1		=DEGREES(PI()/2)				
2						

90

2.14 ISNUMBER

	A	B	C	D	E	F
1	8	=ISNUMBER(A1)				
2						

TRUE

	A	B	C	D	E	F
1	Cat	=ISNUMBER(A1)				
2						

FALSE

2.15 ISEVEN

	A	B	C	D	E	F
1	8	=ISEVEN(A1)				
2						

TRUE

	A	B	C	D	E	F
1	9	=ISEVEN(A1)				
2						

FALSE

2.16 ISODD

	A	B	C	D	E	F
1	8	=ISODD(A1)				
2						

FALSE

	A	B	C	D	E	F
1	9	=ISODD(A1)				
2						

TRUE

2.17 ISBLANK

	A	B	C	D	E	F
1		=ISBLANK(A1)				
2						

TRUE

	A	B	C	D	E	F
1	Cats	=ISBLANK(A1)				
2						

FALSE

2.18 BASE

	A	B	C	D	E	F
1		=BASE(16; 2; 8)				
2		=BASE(255, 2; 8)				
3		=BASE(3; 2; 8)				

00010000
11111111
00000011

2.19 MOD

	A	B	C	D	E	F
1		=MOD(5; 2)				
2		=MOD(10; 9)				
3		=MOD(8; 3)				

1
1
2

2.20 ROMAN

	A	B	C	D	E	F
1		=ROMAN(1453)				
2		=ROMAN(2025)				
3		=ROMAN(8)				
4		=ROMAN(105)				
5		=ROMAN(50)				

MCDLIII
MMXXV
VIII
CV
L

2.21 Function Composition

2.21.1 Example 1

=SQRT(POWER(3;2) + POWER(4;2))

Answer:

5

2.21.2 Example 2

=LOG10(POWER(10;4))

Answer:

4

2.21.3 Example 3

=ROUNDUP(SQRT(50);3)

Answer:

7.072

2.21.4 Example 4

=ABS(MOD(29;6))

Answer:

5

3 Statistical Functions

3.1 MIN

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=MIN(A1:A4)					

5

3.2 MAX

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=MAX(A1:A4)					

3.3 VAR

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=VAR(A1:A4)					

10.9166666666667

3.4 STDEV

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=STDEV(A1:A4)					

3.30403793359984

3.5 SUM

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=SUM(A1:A4)					

3.6 PRODUCT

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=PRODUCT(A1:A4)					

4620

3.7 AVERAGE

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=AVERAGE(A1:A4)					

8.75

3.8 COUNT

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=COUNT(A1:A4)					

4

3.9 MEDIAN

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=MEDIAN(A1:A4)					

9.0

3.10 PERCENTILE

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=PERCENTILE(A1:A4; 0)					

5

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=PERCENTILE(A1:A4; 1)					

12

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=PERCENTILE(A1:A4; 0.5)					

9

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=PERCENTILE(A1:A4; 0.25)					

6.5

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=PERCENTILE(A1:A4; 0.75)					

11.25

3.11 QUARTILE

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=QUARTILE(A1:A4; 0)					

5

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=QUARTILE(A1:A4; 1)					

6.5

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=QUARTILE(A1:A4; 2)					

9

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=QUARTILE(A1:A4; 3)					

11.25

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=QUARTILE(A1:A4; 4)					

12

3.12 SKEW

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=SKEW(A1:A4)					

-0.592518588276328

	A	B	C	D	E	F
1	5					
2	7					
3	12					
4	11					
5	=KURT(A1:A4)					

-3.86900530272129

3.13 CORREL

	A	B	C	D	E	F
1	5	10				
2	7	14				
3	12	24				
4	11	22				
5	=CORREL(A1:A4; B1:B4)					

1

	A	B	C	D	E	F
1	5	22				
2	7	24				
3	12	14				
4	11	10				
5	=CORREL(A1:A4; B1:B4)					

-0.862595419847328

3.14 FACT

	A	B	C	D	E	F
1	=FACT(5)					
2						

120

3.15 COMBIN

	A	B	C	D	E	F
1	=COMBIN(5; 2)					
2						

$$nCr = \frac{n!}{r!(n-r)!} = \frac{5!}{2!(5-2)!} = \frac{5 \times 4 \times 3!}{2 \times 1 \times 3!} = \frac{20}{2} = 10$$

10

3.16 SUMSQ

	A	B	C	D	E	F
1	1					
2	2					
3	3					
4	4					
5	=SUMSQ(A1:A4)					

30

4 Logical Functions

4.1 AND

	A	B	C	D	E	F
1		TRUE	FALSE			
2		TRUE	TRUE			
3		FALSE	FALSE			
4		=AND(B1:C1)				
5		=AND(B2:C2)				
6		=AND(B3:C3)				

FALSE
TRUE
FALSE

4.2 OR

	A	B	C	D	E	F
1		TRUE	FALSE			
2		TRUE	TRUE			
3		FALSE	FALSE			
4		=OR(B1:C1)				
5		=OR(B2:C2)				
6		=OR(B3:C3)				

TRUE
TRUE
FALSE

4.3 NOT

	A	B	C	D	E	F
1		TRUE				
2		TRUE				
3		FALSE				
4		=NOT(B1)				
5		=NOT(B2)				
6		=NOT(B3)				

FALSE
FALSE
TRUE

4.4 XOR

	A	B	C	D	E	F
1		TRUE	FALSE			
2		TRUE	TRUE			
3		FALSE	TRUE			
4		FALSE	FALSE			
5		=XOR(B1:C1)				
6		=XOR(B2:C2)				
7		=XOR(B3:C3)				

TRUE
FALSE
TRUE
FALSE

4.5 IF

	A	B	C	D	E	F
1	5	6	12	-1	10	
2	=IF(A1 = 5; TRUE; FALSE)					
3	=IF(AND(A1 >= 5; SIGN(D1) = -1); "YES"; "NO")					
4	=IF(AND(A1 = 5; B1 = 6; C1 > 5); "YES"; "NO")					
5	=IF(A1 < 0; "NEG"; IF(A1 = 0; "ZERO"; "POS"))					
6						
7						

TRUE
YES

YES
POS

4.5.1 IF...ELSEIF...ELSEIF...ELSE

	A	B	C	D	E	F
1	5	22				
2	7	24				

Write an IF statement to handle this situation:

- If the value in A1 is less than 10, return "LOW"
- If the value in A1 is between 10 and 20 (inclusive), return "MEDIUM"
- If the value in A1 is between 21 and 30 (inclusive), return "HIGH"
- If the value in A1 is greater than 30, return "VERY HIGH"

```
=IF(A1 < 10; "LOW";  
  IF(AND(A1 >= 10; A1 <= 20); "MEDIUM";  
    IF(AND(A1 >= 21; A1 <= 30); "HIGH";  
      "VERY HIGH")))
```

A shorter version:

```
=IF(A1 < 10; "LOW";  
  IF(A1 <= 20; "MEDIUM";  
    IF(A1 <= 30; "HIGH";  
      "VERY HIGH")))
```

The answer is

LOW

Use IFS function (if your Excel supports it):

```
=IFS(A1 < 10; "LOW";  
  AND(A1 >= 10; A1 <= 20); "MEDIUM";  
  AND(A1 >= 21; A1 <= 30); "HIGH";  
  A1 > 30; "VERY HIGH")
```

4.5.2 How many real roots?

	A	B	C	D	E	F
1	-1	5	100			
2	=POWER(B1; 2) - 4 * A1 * C1					

Write an IF statement (indeed they are expressions in Excel) to determine how many real roots the quadratic equation $Ax^2 + Bx + C = 0$ has, based on the values in A1, B1, and C1. Return 0 (No real roots), 1 (repeated root), or 2 (two real roots).

```
=IF(B2 < 0; 0;  
    IF(B2 = 0; 1; 2))
```

Use IFS function (if your Excel supports it):

```
=IFS(B2 < 0; 0;  
     B2 = 0; 1;  
     B2 > 0; 2)
```

4.5.3 How is the weather outside?

Suppose that the temperature is in cell A1 (in degrees Celsius). Write an IF statement to return the following:

- If the temperature is less than or equal to 0, return "Freezing"
- If the temperature is greater than 0 but less than or equal to 15, return "Cold"
- If the temperature is greater than 15 but less than or equal to 25, return "Warm"
- If the temperature is greater than 25 but less than or equal to 35, return "Hot"
- If the temperature is greater than 35, return "Too Hot"

```
=IF(A1 <= 0; "Freezing";  
    IF(A1 <= 15; "Cold";  
        IF(A1 <= 25; "Warm";  
            IF(A1 <= 35; "Hot";  
                "Too Hot"))))
```

Use IFS function (if your Excel supports it):

```
=IFS(A1 <= 0; "Freezing";  
     A1 <= 15; "Cold";  
     A1 <= 25; "Warm";  
     A1 <= 35; "Hot";  
     A1 > 35; "Too Hot")
```

5 Random Numbers

5.1 RAND

	A	B	C	D	E	F
1		=RAND()				
2						

```
// A random number between 0 and 1, e.g.  
0.5432101234
```

5.2 RANDBETWEEN

	A	B	C	D	E	F
1		=RANDBETWEEN(1; 10)				
2						

```
// A random integer between 1 and 10, e.g.  
// The range is inclusive, so 1 and 10 are possible outputs  
7
```

6 Date and Time Functions

6.1 NOW

	A	B	C	D	E	F
1		=NOW()				
2						

```
01/12/25 08:10 PM
```

6.2 YEAR

	A	B	C	D	E	F
1		01/12/25 08:10 PM				
2		=YEAR(B1)				

```
2025
```

6.3 MONTH

	A	B	C	D	E	F
1		01/12/25 08:10 PM				
2		=MONTH(B1)				

12

6.4 DAY

	A	B	C	D	E	F
1		01/12/25 08:10 PM				
2		=DAY(B1)				

1

6.5 HOUR

	A	B	C	D	E	F
1		01/12/25 08:10 PM				
2		=HOUR(B1)				

20

6.6 MINUTE

	A	B	C	D	E	F
1		01/12/25 08:10 PM				
2		=MINUTE(B1)				

10

6.7 SECOND

	A	B	C	D	E	F
1		01/12/25 08:10 PM				
2		=SECOND(B1)				

50

7 String Functions

7.1 CHAR

	A	B	C	D	E	F
1		=CHAR(65)				
2						

A

7.2 CODE

	A	B	C	D	E	F
1		=CODE("B")				
2						

66

7.3 UNICODE

	A	B	C	D	E	F
1		=UNICODE("😊")				
2						

9786

7.4 UNICHAR

	A	B	C	D	E	F
1		=UNICHAR(9786)				
2						

Output: 😊

7.5 LOWER

	A	B	C	D	E	F
1		istanBUL				
2		=LOWER(B1)				

istanbul

7.6 UPPER

	A	B	C	D	E	F
1		istanBUL				
2		=UPPER(B1)				

İSTANBUL

7.7 CONCATENATE

	A	B	C	D	E	F
1		İstanbul	University			
2		=CONCATENATE(B1; C1)				

İstanbulUniversity

	A	B	C	D	E	F
1		İstanbul	University			
2		=CONCATENATE(B1;" "; C1)				

İstanbul University

7.8 LEFT

	A	B	C	D	E	F
1		İstanbul	University			
2		=LEFT(B1; 3)				

İst

7.9 RIGHT

	A	B	C	D	E	F
1		İstanbul	University			
2		=RIGHT(B1; 3)				

bul

7.10 MID

	A	B	C	D	E	F
1		İstanbul	University			
2		=MID(B1; 6; 3)				
3		=MID(C1; 5; 2)				

bul
er

7.11 LEN

	A	B	C	D	E	F
1		İstanbul	University			
2		=LEN(B1)				
3		=LEN(C1)				

8
10

7.12 ISTEXT

	A	B	C	D	E	F
1		İstanbul	1453			
2		=ISTEXT(B1)				
3		=ISTEXT(C1)				

TRUE
FALSE

7.13 ISNONTEXT

	A	B	C	D	E	F
1		İstanbul	1453			
2		=ISNONTEXT(B1)				
3		=ISNONTEXT(C1)				

FALSE
TRUE

7.14 REPLACE

	A	B	C	D	E	F
1		Istanbul				
2		=REPLACE(A1; 4; 2; "*")				
3		=REPLACE(A1; 3; 5; "?")				

Is*bul
Is?l

7.15 SEARCH

	A	B	C	D	E	F
1		Istanbul				
2		=SEARCH("bul"; A1)				
3		=SEARCH("tan"; A1)				
4		=SEARCH("something"; A1)				

6
3
#VALUE!

7.16 VLOOKUP

Basic Usage:

=VLOOKUP(lookup_value; table_array; col_index_num; [range_lookup])

where

- **lookup_value** is the value to search for in the first column of the table_array
- **table_array** is the range of cells that contains the data
- **col_index_num** is the column number in the table_array from which to retrieve the value
- **range_lookup** is a logical value that specifies whether to find an exact match (FALSE) or an approximate match (TRUE). If omitted, TRUE is assumed

	A	B	C	D	E	F
1	2	Economics				
2	3	Industrial Relations				
3	5	Econometrics				
4	8	Business Administration				
5		=VLOOKUP(8; A1:B4; 2; FALSE)				

Business Administration

Description of the example:

- The function looks for the value 8 in the first column of the range A1:B4
- It finds the value 8 in cell A4
- It then retrieves the value from the second column of the same row, which is "Business Administration"

	A	B	C	D	E	F
1	101	Introduction to Economics	4			
2	102	Information Technologies	2			
3	103	Basic Statistics	3			
4	104	Operations Research	3			
5		=VLOOKUP(104; A1:C4; 3; FALSE)				

The output:

3

Why? Because the function looks for the value 104 in the first column of the range A1:C4, finds it in cell A4, and retrieves the value from the third column of the same row, which is 3.

8 Visual Basic for Applications (VBA)

8.1 times function

```
' This function returns the product of two numbers
Function times(a, b)
    times = a * b
End Function
```

Usage in Excel:

=times(5; 6)

8.2 factorial function

```
Rem This function returns factorial of n
Function factorial(n)
    Dim result As Long
    Dim i As Long
    result = 1

    For i = 2 To n
        result = result * i
    Next

    factorial = result
End Function
```

Usage in Excel:

=factorial(5)

8.3 paraboladelta function

```
Rem This functions returns delta of a given parabola
Function paraboladelta(a As Double, b As Double, c As Double) As Double
    paraboladelta = b * b - 4 * a * c
End Function
```

Usage in Excel:

=paraboladelta(1; -3; 2)

8.4 numberofroots function

```
' This function returns
' -> 0, if delta < 0
' -> 1, if delta = 0
' -> 2, if delta > 0
Function numberofroots(a As Double, b As Double, c As Double) As Integer
    Dim delta As Double
    delta = b * b - 4 * a * c
    If delta < 0 Then
        numberofroots = 0
    ElseIf delta = 0 Then
        numberofroots = 1
    Else
        numberofroots = 2
    End If
End Function
```

Usage in Excel:

=numberofroots(1; -3; 2)

8.5 findminimum function

```
' This function returns the minimum of a given range  
Function findminimum(r As Range) As Double  
    mymin = 9999999  
    For i = 1 To r.Count  
        If r.Cells(i, 1) < mymin Then  
            mymin = r.Cells(i, 1)  
        End If  
    Next  
    findminimum = mymin  
End Function
```

Usage in Excel:

```
=findminimum(A1:A10)
```