

## Exercise 10: Mathematical and Statistical Functions

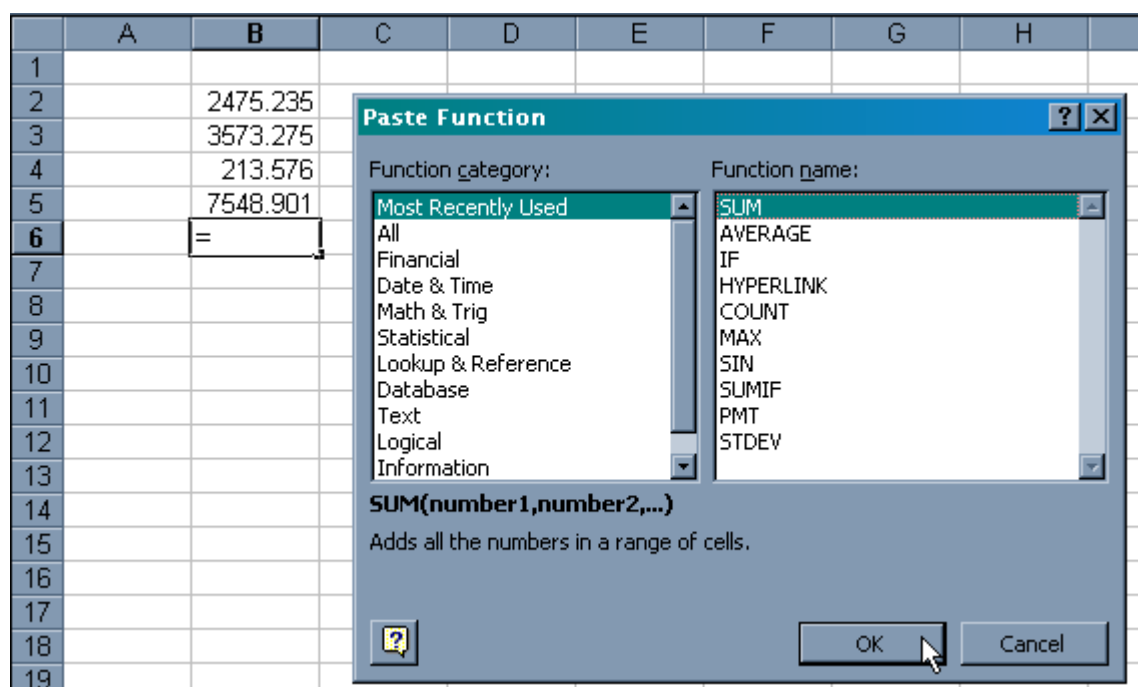
### After completing this exercise you will:

- have a better understanding of the structure of functions and their arguments.
- be able to insert and use Excel's in-built Mathematical Functions.
- be able to insert and use some of Excel's in-built Statistical functions.

Excel contains a number of mathematical functions which you can use in your worksheets. You should already be familiar with one of the most common mathematical functions, SUM, that returns the sum of a series of values.

### SUM(values)

1. Open your original workbook itcExs.xls and insert a new worksheet called Ex-10
2. Enter the numbers 2475.23456, 3573.275, 213.576, 7548.901 in cells B2:B5;
3. Either select cell B6 and click on the AutoSum button  $\Sigma$  on the Standard Toolbar;
4. Or select Sum from the Insert/Paste Function dialog box and select OK:

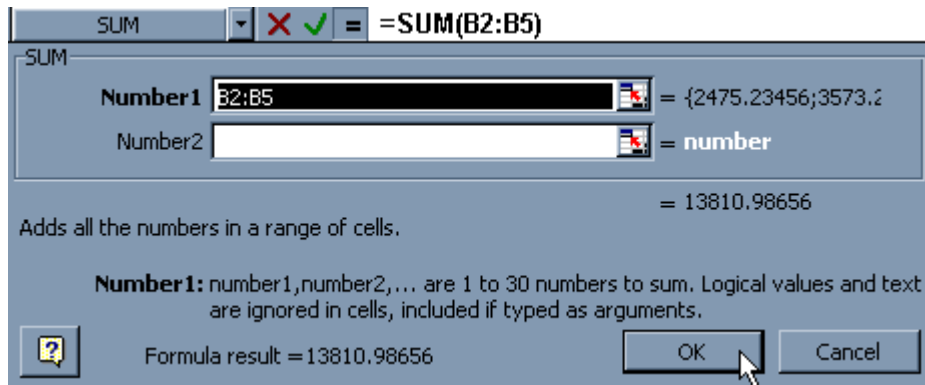


Select OK on the function dialog box and the sum of the values in cells B2:B5 is returned in cell B6:

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In the Function list the functions are sorted into categories, the most recently used functions are listed first - these will change from one user to another depending on the type of work they are doing. If you are unsure which category the command you want is likely to be you can always select All which will produce a total list of all the functions available.

Note that although a value is displayed in cell B6 the number is merely rounded to the nearest decimal place for display purposes only. If the width of column is increased the actual value in cell B6 is displayed, this is the one that would be used in any calculation should the B6 form part of a formula in another cell:

	A	B	C	D	Formula Bar
1					
2		2475.23456			
3		3573.275			
4		213.576			
5		7548.901			
6		13810.98656			

	A	B	C	D	Formula Bar
1					
2		2475.235			
3		3573.275			
4		213.576			
5		7548.901			
6		13810.99			

There are many more mathematical functions in Excel that you can include in your worksheets. Some of these are explored in the Hands-On exercises. You can either enter functions by typing them manually or use the function wizard to help you insert a function.

#### The ROUND Function - Math & Trig

=ROUND(value,x) where x = a number between -15 and +15. This sets the precision of the number to x decimal points.

1. Move to cell C2 and enter the formula =ROUND (B2,0)
2. Move to cell C3 and enter the formula =ROUND(B2,3)

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3. Move to cell C4 and enter the formula =ROUND(B2,-1)
4. Move to cell C5 and enter the formula =ROUND(B2,2)
5. Move to cell C6 and enter the formula =ROUND(B2,1)

Look at the values that have been returned in cells C3:C7, do you understand what the ROUND functions has done? It's important to realise that the ROUND affects the **actual** value not just the value that is displayed in the cell.

### **ROUNDUP(value,x) and ROUNDDOWN (value,x) - Math & Trig**

where x = a number between -15 and +15. This sets the precision of the number to x decimal points. ROUNDUP rounds a number up to the nearest specified decimal place. ROUNDDOWN rounds the number down to the nearest decimal place.

1. Move to cell D2 and enter the formula =ROUNDUP(B2,0)
2. Move to cell D3 and enter the formula =ROUNDUP(B2,3)
3. Move to cell D4 and enter the formula =ROUNDUP(B2,-1)
4. Move to cell D5 and enter the formula =ROUNDDOWN(B2,0)
5. Move to cell D6 and enter the formula =ROUNDDOWN(B2,3)
6. Move to cell D7 and enter the formula =ROUNDDOWN(B2,-1)

Look at the values that have been returned in cells D2:D6, do you understand how the ROUNDUP and ROUNDDOWN functions work? Can you think of a situation when you would use these functions? For example, as part of the coursework you have to create a formula for Members Joining in the Sales&Expenditure worksheet of the Bacchus workbook. Hint: you can only have 'whole' people, not fractions of people joining as new members, so the ROUNDUP function needs to be used to ensure that the formula returns a whole number.

### **ABS(number) - Math & Trig**

Returns the absolute value of a number, ie. a number without its sign.

1. Move to cell B8 and enter the value -32.5
2. In cell B9 enter the formula =ABS(B8). Note the result, do you understand how the function works?


### **TRUNC(number) - Math & Trig**

Truncates a number to an integer by removing the decimal, or fractional, part of the number.

1. Move to cell E2 and enter the formula =TRUNC(B2)
2. Move to cell E3 and enter the formula =B2\*2.1
3. Move to cell E4 and enter the formula = TRUNC(B2\*2.1)
4. Move to cell E5 and enter the formula =TRUNC(2.1)\*E2
5. Compare the results of the calculations, again make sure you understand what is going on.

### **AVERAGE(values) - Statistical**

Returns the average of a series of values.

1. Move to cell F2 and enter the formula =AVERAGE(40,60,35,20,55,30,57,45)
2. Move to cell F3 and use the Function Wizard  to enter the formula =AVERAGE(E2:E5)
3. It is also possible to nest functions within other functions, for example to roundup the average of cells E2:E5 to zero decimal places, you would enter the following formula in cell F4 = ROUNDUP(AVERAGE(E2:E5),0)

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4. Look at the values returned in the cells - make sure you understand what is going on.

**MAX(values) - Statistical**

Returns the maximum value in a series of values.

1. Move to cell G2 and enter the formula =MAX(E2:E5,F2:F4)
2. Look at the value returned in cell G2 - do you understand how the function works?

**MIN(values) - Statistical**

Returns the minimum value in a series of values.

1. Move to cell H2 and enter the formula =MIN(E2:E5,F2:F4)
2. Look at the value returned in cell H2 - do you understand what is going on?

**COUNT(range) - Statistical**

Counts the number of cells that contain numbers and numbers within the list of arguments. Used to determine the number of entries in a number filed in a range or array of numbers.

**COUNTA(range) - Statistical**

Counts the number of cells that are not empty. Used to count the number of cells that contain data in a range or array of numbers.

**COUNTBLANK(range) - Statistical**

Counts the number of cells in a specified range that are empty and do not contain any data.

1. Enter the following column headings: B1 = SUM; C1 = ROUND; D1 = ROUNDUP, ROUNDDOWN; E1 = TRUNC; F1 = AVERAGE; G1 = MAX, H1 = MIN, B7 =ABS
2. Move to cell I2 and enter the formula =COUNT(B1:B7)
3. Move to cell J2 and enter the formula =COUNTA(B1:B7)
4. Move to cell K2 and enter the formula =COUNTBLANK(B1:B7)

Look at the values that are returned in cells I2:K2 - make sure you understand what is going on.