



**Microsoft Excel 2016
Advanced User
Course Notes**

Sample

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Chris Page

11 River Gardens, Shawbury, Shrewsbury, SY4 4LA

Tel 01939 251094

www.pagecommunication.co.uk

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COURSE OBJECTIVES

By the end of this course you will be able to

- Correctly use text functions & wizards to manipulate cell values, referring to notes if necessary.
- Briefly describe how rounding functions work.
- Correctly create a specified array formula, referring to notes if necessary.
- Correctly apply customised number formats to data, referring to notes if necessary.
- Accurately apply conditional formatting to specified cells, referring to notes if necessary.
- Validate data for a cell within specified limits, without reference to notes.
- Trace dependent cells and precedent cells for a specified cell, referring to notes if necessary.
- Correctly hide specified columns, rows and worksheets within a workbook, referring to notes if necessary.
- Correctly connect to an external data source as specified, referring to notes if necessary.
- Accurately consolidate data from multiple workbooks, referring to notes if necessary.
- Accurately create a pivot table containing slicers from supplied data, referring to notes if necessary.
- Correctly carry out a specified 'what-if' analysis, referring to notes if necessary.

MODULE 1 – FORMULAS AND FUNCTIONS

OBJECTIVES

At the end of this section you will be able to:

- Correctly use text functions & wizards to manipulate cell values, referring to notes if necessary.
- Briefly describe how rounding functions work.
- Correctly create a specified array formula, referring to notes if necessary.

REVISION

Formulas

Arithmetic formulas are used to calculate numeric values using the following arithmetic operators:

*	multiplication	/	division
+	addition	-	subtraction
^	ordinals (exponentiation)	%	percentage

An arithmetic formula may contain numbers or cell references.

To create an arithmetic formula

1. Select the cell to contain the formula and press = (equals).
2. Type in the desired numbers and arithmetic operators. If a cell reference is to be used point to the required cell by clicking on it. This method is much easier than typing its reference as this will inevitably lead to mistakes being made.
3. Complete the entry by pressing or clicking the tick on the Formula bar with the mouse.

When using a formula that contains a cell reference it is important to remember that if the value in the cell referred to is changed, then the dependent formula will recalculate. This is the advantage of using computer spreadsheets as various scenarios can be 'tried out'.

Cells containing formulae can be edited in the same way as any other cell. Brackets can be used to change the order of arithmetic precedence.

Shown below are examples of simple statistical functions:

=AVERAGE(cell range)	calculates the average of values in a cell range
=COUNT(cell range)	counts the number of numeric entries in a cell range
=MAX(cell range)	returns the maximum value in a cell range
=MIN(cell range)	returns the minimum value in a cell range
=SUM(cell range) or use the AutoSum button	calculates the sum of a range of values

Using AutoFill

Excel makes it easy to create a series of headings that you use frequently. These can then be reproduced in any workbook by using the fill handle. Excel already recognises the following types of series:

Type	Example
Day	Monday, Tuesday, Wednesday <i>or</i> Mon, Tue, Wed
Month	January, February, March <i>or</i> Jan, Feb, Mar <i>or</i> Month 1, Month 2, Month 3
Quarters	Quarter 1, Quarter 2, Quarter 3 <i>or</i> Qtr 1, Qtr 2, Qtr 3
Weeks	Week 1, Week 2, Week 3 <i>or</i> Wk 1, Wk 2, Wk 3
Text and numbers	Item 1, Item 2, Item 3, <i>or</i> Paragraph 1.2, Paragraph 1.3, Paragraph 1.4

To use the above series with the fill handle

1. Enter the first item of text in a cell
2. Drag the fill handle over the cells you wish to include in the series
3. Release the mouse button.

NESTING FUNCTIONS

Functions can be regarded as nested when one function is used inside another to supply arguments, or data, that the other function requires. When a nested function is used as an argument, it must return the *same type* of value that the argument uses. For example, if the argument returns a TRUE or FALSE value, then the nested function must return a TRUE or FALSE. If it doesn't, Excel displays a #VALUE! error value. A formula can contain up to 64 levels of nested functions. When Function B is used as an argument in Function A, Function B is a second-level function.

LOGIC FUNCTIONS

AND function

This function returns TRUE if all its arguments evaluate to TRUE; returns FALSE if one or more arguments evaluate to FALSE.

One common use for the AND function is to expand the usefulness of other functions that perform logical tests. For example, the IF function performs a logical test and then returns one value if the test evaluates to TRUE and another value if the test evaluates to FALSE. By using the AND function as the logical test argument of the IF function, you can test many different conditions instead of just one.

The syntax is: AND(logical1, [logical2], ...)

logical1 is required and is the first condition that you want to test that can evaluate to either TRUE or FALSE. *logical2, etc* are all optional and are additional conditions that you want to test that can evaluate to either TRUE or FALSE, up to a maximum of 255 conditions.

OR Function

This function returns TRUE if any of its arguments evaluate to TRUE; returns FALSE if all arguments evaluate to FALSE.

The syntax is: OR(logical1, [logical2], ...)

logical1 is required and is the first condition that you want to test that can evaluate to either TRUE or FALSE. *logical2, etc* are all optional and are additional conditions that you want to test that can evaluate to either TRUE or FALSE, up to a maximum of 255 conditions.

TEXT FUNCTIONS

Excel provides several text functions to help you to manipulate text. They are particularly useful when text has been imported from a mainframe or from another package in ASCII format. Some of the most frequently used functions are:

LOWER(text)	This function converts the text to lower case.
UPPER(text)	This function converts the text to upper case.
PROPER(text)	This function converts the first character of each word to upper case and all subsequent characters to lower case.
LEFT(text, number_of_chars)	This function displays a given number of characters starting from the left of the text. The number of characters required is the second argument in the function.
RIGHT(text, number_of_chars)	This function displays a given number of characters starting from the right of the text. The number of characters required is the second argument in the function.
MID(text, start_number, number_of_chars)	This function displays characters from the specified text, beginning at the character in the start_number position and extending for the number of characters specified in the third argument of the function.
LEN(text)	This function returns the number of characters in the specified text.
TEXT(value, format_text)	This function converts a numeric value to text and displays it with the format specified by format_text. The format must be one of Excel's pre-defined custom number formats. It is particularly useful when combining a number with a string of text, as in the following example. ="My salary is "&TEXT(A1,"£#,##0.00") where cell A1 contains the salary figure. Text and numbers are joined by the & symbol.
CONCATENATE(text1,text2....)	This function joins several items of data to form a string of text, similar to the above example.
FIND(find_text, within_text, start_number)	This function is used to find specified text within a cell.

Find_text is the text you want to find. If find_text is "" (empty text), FIND matches the first character in the search string (that is, the number position of the character numbered by start_num). Find_text cannot contain any wildcard characters.

Within_text is the text containing the text you want to find.

Start_number specifies the character at which to start the search. The first character in within_text is character number 1. If you omit start_num, it is assumed to be 1.

Note: If find_text does not appear in within_text, FIND returns the #VALUE! error value.

If start_num is not greater than zero, FIND returns the #VALUE! error value.

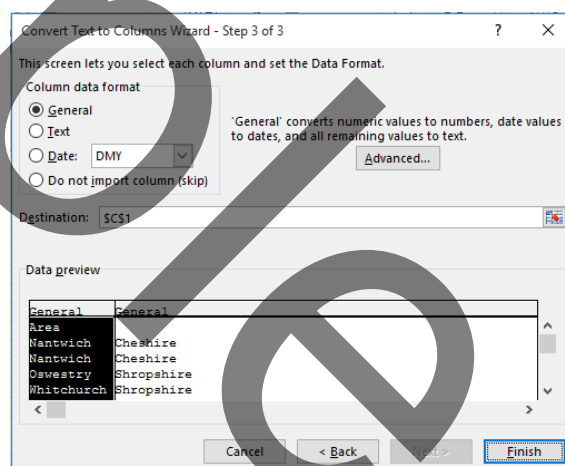
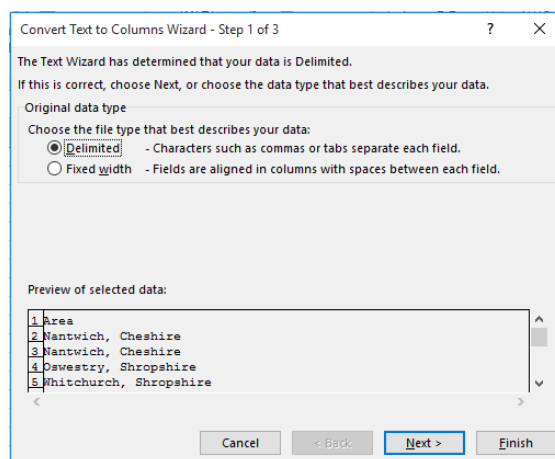
If start_num is greater than the length of within_text, FIND returns the #VALUE! error value.

USING THE TEXT TO COLUMNS WIZARD

The Convert Text to Columns Wizard is an easy way to separate simple cell content, such as first names and last names, into different columns.

To split a column nominating the split character

1. Select the range of data that you want to convert.
2. Select the **Data** ribbon and in the *Data Tools* group click on the **Text to Columns** button. The *Convert Text to Columns Wizard* is displayed
3. In step 1 of the Convert Text to Columns Wizard, select *Delimited* and then click on the **Next** button.
4. In Step 2, select the check box that corresponds to the character that separates one part of the cell entry and the other part. Make sure you clear the other check boxes in the Delimiters section. (For example with first and last names of people, the character that separates the first name and last name of a person is the space character and is therefore the delimiter.) For any characters not listed select *Other* and type the character in the box.
5. The *Data Preview* window shows the column to be split in two separate lists. *Note: If your list contains middle names for example, the full name will be distributed into three separate columns: first, middle, and last. Also if you are likely to have more than one delimiting character together (ie two spaces) then tick the box marked Treat consecutive delimiters as one.*
6. Click on **Next**.
7. In step 3, click a column in the *Data Preview* window, and then in the *Column data format* section, select the format that you want applied to the new column (normally they are General). Repeat this step for each column in the *Data Preview* window. Only do this if the default General format is not required.
8. If you want to show the separated content in the columns next to the full name (ie you do not want to overwrite the existing column of data), click in the *Destination* box, and then select the first cell in the column where you want the split data to be pasted (\$C\$1, in this example). *Important: If you do not specify a new destination for the new columns, the divided data will replace the combined data and any adjacent columns.*
9. Finally, click on **Finish**.




Note: The Text to Columns wizard works with your manually processing the data. If you need to automatically process a column of data, you would need to use a combination of text formulas to achieve the same result.

COUNTING FUNCTIONS

Count is available using Autosum, but there are two other count functions that might be useful.

- **COUNTA(value1, value2..)** This function counts the number of cells that are not empty and the values within the list of arguments. You can use COUNTA to count the number of cells that contain data in a range or array using COUNTA(Range). This function would count a cell that contains a formula even if the formula produces a blank result in that cell. The COUNT function would ignore such a cell.
- **COUNTBLANK(Range)** This function counts empty cells in a specified range of cells. It would include a cell that contains a formula if the result is a blank cell. However, note that this does not work when linked to a range in a closed workbook.

ROUNDING FUNCTIONS

The display of numbers can be modified to show rounded numbers using the Decrease Decimal button on the Formatting toolbar. However, the number shown in the cell is not the number used by Excel in any calculations – Excel still uses the underlying accurate number. There may be times when you want to use a rounded number. 

- **ROUND(number,num_digits)** This function rounds a number to a specified number of digits. *Number* is the number you want to round, and *Num_digits* specifies the number of digits to which you want to round the number. If *Num_digits* is 0 then you get the rounded down whole number; if it is a positive number you get rounding down at that number of decimal places; if it is negative you get that number of digits rounded to the left of the decimal point.

For example: ROUND(1231.4905, 2) gives 1231.49
ROUND(1231.4905, 0) gives 1231
ROUND(1231.4905, -2) gives 1200

The following example will round a number in cell A1 to the 3 most significant digits:
=ROUND(A1,3-LEN(INT(A1)))

- **ROUNDDOWN(number,num_digits)** This rounds a number down to a specified number of digits. *Number* is the number you want to round, and *Num_digits* specifies the number of digits to which you want to round the number. If *Num_digits* is 0 then you get the rounded down whole number; if it is a positive number you get rounding down at that number of decimal places; if it is negative you get that number of digits rounded to the left of the decimal point.

For example: ROUNDDOWN(1256.5965, 2) gives 1256.59
ROUNDDOWN(1256.5965, 0) gives 1256
ROUNDDOWN(1256.5965, -2) gives 1200

- **ROUNDUP(number,num_digits)** This rounds a number up to a specified number of digits. *Number* is the number you want to round, and *Num_digits* specifies the number of digits to which you want to round the number. If *Num_digits* is 0 then you get the rounded down whole number; if it is a positive number you get rounding down at that number of decimal places; if it is negative you get that number of digits rounded to the left of the decimal point.

For example: ROUNDUP(1246.4865, 2) gives 1246.49
ROUNDUP(1246.4865, 0) gives 1247
ROUNDUP(1246.4865, -2) gives 1300

EXERCISE 1

1. Open the workbook **Estate**. This estate agent has listed all the properties on the books by entering the town and county information in one field.
2. Split up the data from the *Area* column to show separate *Town* and *County* columns in columns C and D.
3. Create an array formula in cell F46 that calculates the Sum of the *Price* column multiplied by the *Percentage Fee* column. This will end up as `=SUM(E2:E43*F2:F43)`
4. Close and save the changes.

Sample

EXERCISE 2

1. Open the workbook file **Workers**
2. Create a formula in cell G2 that calculates the workers age as of today (ie the date that the workbook is currently opened)
3. Copy down for all the personnel using the fill handle.
4. Close and save the changes.

Sample