

# Skill Set 5

## Outlines and Complex Functions

By the end of this Skill Set you should be able to:

- Create an Outline
- Work with an Outline
- Create Automatic Subtotals
- Use a variety of Complex Functions
- Use Nested Functions
- Use Array Formulas
- Correct Formulas that Produce Errors

## Exercise 37 - Creating an Outline

### Knowledge:

An **Outline** is used to hide parts of a worksheet, making it easier to see the more important areas. Different users may need to see different information or different amounts of information.

An outline can show up to eight different **levels**, both horizontally and vertically, with each level showing a different amount of data. The levels are **displayed** or **hidden** to show the required data.

### Activity:

1. Open the workbook **Home**.
2. Display the **Data** tab and click the **Group** button drop down list and select **Auto Outline**. *Excel* assumes that the summary rows (the formulas) are at the bottom of the detail and the summary columns are to the right.

Level Buttons

Row Level Bars

Hide Buttons

	1	2	3	A	B	C	D	E	F	G	H	I	J	K
1	Home			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
2	Pay	385	385	385	400	400	400	400	400	400	400	400	400	400
3	Other Income	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Total Income	385	385	385	400	400	400	400	400	400	400	400	400	400
5	Rent	80	80	80	80	80	80	80	80	80	90	90	90	90
6	Holidays	0	0	0	50	0	0	0	0	0	210	0	0	0
7	Leisure	75	55	48	75	40	48	56	180	30	35	35	35	35
8	Electricity	49	0	0	43	0	0	29	0	0	31	31	31	31
9	Gas	46	0	0	51	0	0	32	0	0	35	35	35	35
10	Telephone	0	37	0	0	35	0	0	36	0	0	27	27	27
11	Car	0	0	91	0	0	13	0	0	74	27	27	27	27
12	Petrol	20	25	25	20	25	20	20	50	25	25	25	25	25
13	Food	60	60	60	75	60	55	50	80	55	60	60	60	60
14	Others	55	45	100	65	75	150	100	75	45	34	34	34	34
15	Total Expenses	385	302	404	459	315	366	367	721	319	337	337	337	337
16	Savings	0	83	64	5	90	124	157	-164	-83	-20	-20	-20	-20
17														





3. The outline has been created. It has 3 row levels and 2 column levels. Notice the various buttons and bars above and to the left of the worksheet.
4. Row and column level buttons, **1 2 3**, indicate the number of levels in an outline. Click on them to display a specific level - the lower the number, the less detail is displayed.
5. To remove the **Auto Outline**, on the **Data** tab, click the **Ungroup** drop down list and select **Clear Outline**. The outline is removed.
6. Close the workbook without saving.

## Exercise 38 - Working with an Outline

### Knowledge:

**Outlines** are used to restrict the amount of data seen on a worksheet. When an outline is created, the levels appear around summary rows and columns, as these are usually the most important areas of a worksheet. Levels can be expanded and collapsed using the level buttons as described in the last exercise.

### Activity:

1. Open the workbook **Outline**.
2. To add an **Auto Outline** to the worksheet, click the **Group** button drop down on the **Data** tab and select **Auto Outline**.
3. The outline is fully expanded. It has 4 row levels and 2 column levels. Hide the first level of rows by clicking on the row level button **3**. This is one level down. Only the totals are shown for **Turnover** and **Spending**, the detailed lines are hidden.
4. Hide more rows by clicking on the **Hide Detail** symbol, , for the **second** level. **Turnover** and **Spending** are now hidden behind the **Profit** row.
5. Hide all columns and rows by clicking on the row level button **1** and the column level button **1**. The worksheet is now fully collapsed, showing only **Tax** and **Net Profit** for the whole year.
6. Display the rows to the **third** level by clicking on the row level button **3**.
7. Click on the **Show detail** symbol, , next to row **10** to display the detail behind the **Spending** row.
8. Practise showing and hiding levels using the  and  symbols.

**Note:** Levels can also be hidden by clicking the black line associated with each of the **Hide levels** buttons, .

9. To remove the **Auto Outline**, click the **Ungroup** drop down list and select **Clear Outline**. The outline is removed.
10. Rows and columns can be highlighted and an outline added manually, if the **Auto Outline** is not satisfactory. Highlight rows **2** and **3**, then click **Group** to add an outline level to row **4**.
11. Highlight rows **5** to **9** and group them to add an outline at the same level (the rows are not overlapping).
12. Highlight rows **2** to **13** and **Group** them. Because this overlaps an existing group, a new outline level is added.

## Exercise 38 - Continued

- Highlight columns **B** to **M** and group them to add a horizontal outline. An **Outline** has now been manually created with 3 row levels and 2 column levels, as shown below:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Retail	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2	Sales	2600	2000	2200	2700	3000	3200	2500	1500	1600	2500	6800	8000	38600
3	Article	8.99	8.99	8.99	8.99	8.99	8.99	8.99	8.99	8.99	8.99	8.99	8.99	8.99
4	Turnover	23374	17980	19778	24273	26970	28768	22475	13485	14384	22475	61132	71920	347014
5	Stock	4000	3000	6000	8000	8000	7000	3000	4000	10000	12000	15000	14000	94000
6	Promotion	0	0	2500	0	0	2000	0	2000	8000	8000	4000	4000	26500
7	Advertising	320	350	450	320	450	350	320	400	300	280	1000	1200	5740
8	Wages	2400	2400	2400	2400	2400	2400	2400	2400	2400	2400	3200	3200	30400
9	Overheads	2800	2500	2000	2000	2000	2000	2000	2000	2000	3000	3500	4000	29800
10	Spending	9520	8250	13350	12720	12850	13750	7720	8800	16700	25680	30700	26400	186440
11	Profit	13854	9730	6428	11553	14120	15018	14755	4685	-2316	-3205	30432	45520	160574
12	Tax rate	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
13	Tax	6927	4865	3214	5777	7060	7509	7378	2343	0	0	15216	22760	83048
14	Net Profit	6927	4865	3214	5777	7060	7509	7378	2343	-2316	-3205	15216	22760	77527

- Collapse all the levels.
- Expand all the levels and highlight rows **2** and **3**, then click the **Ungroup** button to remove a part of the **Outline**.

	A	B	C
1	Retail	Jan	Feb
2	Sales	2600	2000
3	Article	8.99	8.99
4	Turnover	23374	17980
5	Stock	4000	3000
6	Promotion	0	0
7	Advertising	320	350
8	Wages	2400	2400
9	Overheads	2800	2500
10	Spending	9520	8250
11	Profit	13854	9730
12	Tax rate	50%	50%
13	Tax	6927	4865
14	Net Profit	6927	4865
15			


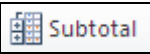
- To remove the whole outline, make sure that no rows or columns are selected, click the **Ungroup** drop down list and select **Clear Outline**.
- Close the workbook without saving.

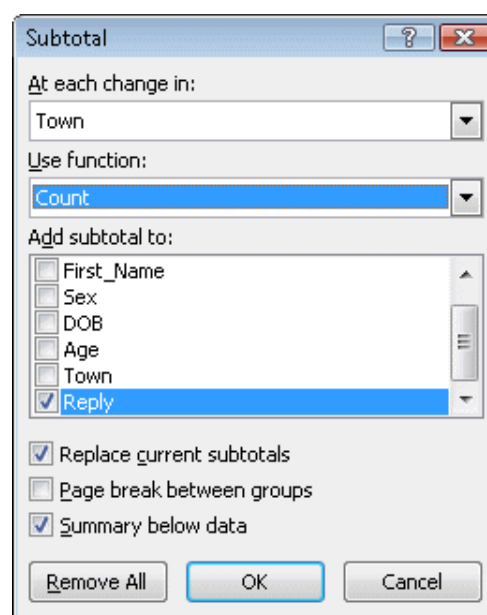
## Exercise 39 - Adding Automatic Subtotals

### Knowledge:

Automatic **Subtotals** can be added to any list that has been sorted. At each change in the column data, **Subtotal** inserts a row and calculates a subtotal. The worksheet has an **Outline** added automatically to be able to control the amount of data viewed.

### Activity:


1. Open the workbook **Survey**. This workbook is a list of over 200 people that have been surveyed.
2. A column must be sorted before adding **Subtotals** to a list, so that similar items are placed together. Place the active cell in column **F** under the title **Town**.
3. On the **Data** tab, click the **Sort A to Z** button, , in the **Sort & Filter** group to sort the towns into alphabetical order.
4. Click the **Subtotal** button, , in the **Outline** group.
5. Select the **Town** field within **At each change in** drop down to match the sorted column. We want to produce a subtotal each time the **Town** changes.
6. Select **Count** from the **Use function** drop down list to count the number of people that have replied to the survey.
7. In **Add subtotal to**, the fields to subtotal are defined. **Reply** is already checked by default.




## Exercise 39 - Continued

- Click **OK** to add **Subtotals**. A count of those records with a **Reply** is shown for each **Town**.

**Note:** To count all records, pick a field that always has an entry, such as **Surname**.

- An **Outline** is added where the amount of data displayed can be controlled. Click on the second level button  at the top of the **Outline Bar** on the left to show just the **Subtotals**.

1	2	3	A	B	C	D	E	F	G
			<u>Survey Analysis</u>						
			Surname	First_Name	Sex	DOB	Age	Town	Reply
								<b>Bristol Count</b>	1
								<b>Carlisle Count</b>	1
								<b>Durham Count</b>	11
								<b>Newcastle Count</b>	11
								<b>South Shields Cou</b>	9
								<b>Sunderland Coun</b>	24
								<b>Tynemouth Count</b>	2
								<b>Washington Coun</b>	16
								<b>Grand Count</b>	75

- To expand a subsection click on  to the left of the required row. Expand the **South Shields** section.
- To hide all the **Subtotals** click the row level button **1**, only the **Grand Count** is displayed.
- To remove subtotals, click on a cell inside the list and then click the **Subtotal** button in the **Outline** group and click the **Remove All** button.
- Close the workbook **Survey** without saving.

## Exercise 40 - Lookup Functions

### Knowledge:

**Lookup & Reference** functions deal mainly with data in tables or ranges, for example retrieving values or transposing vertical and horizontal ranges.

A **Lookup** table consists of a selection of bands, or intervals, where a given value can be found. There are two functions, **HLOOKUP**, which searches a horizontal table and **VLOOKUP**, which searches a vertical table.

### Activity:

1. Open the workbook **Discount**. The worksheet consists of a discount calculation at the top and two lookup tables at the bottom, one horizontal and one vertical, containing the same data. The discount available depends directly on the number of items bought.
2. Click in cell **D8**. To use the **HLOOKUP** function, display the **Formulas** tab, click the **Lookup & Reference** button in the **Function Library** group. Select **HLOOKUP** from the list.
3. The **Function Arguments** dialog box for **HLOOKUP** is displayed.
4. The **Lookup\_value** is cell **D4** (number bought). The **Table\_array** is **C14:I15** (the table without the labels) and the **Row\_index\_num** is **2** (to return the value from the 2nd row of the table). Move the dialog box as required.

Function Arguments

HLOOKUP

Lookup_value	D4	= 5
Table_array	C14:I15	= {1,5,10,20,30,50,100;0,0.1,0.15,0.25,
Row_index_num	2	= 2
Range_lookup		= logical

= 0.1

Looks for a value in the top row of a table or array of values and returns the value in the same column from a row you specify.

**Row\_index\_num** is the row number in table\_array from which the matching value should be returned. The first row of values in the table is row 1.

Formula result = 10%

[Help on this function](#) OK Cancel

**Note:** Setting the **Range\_lookup** to **FALSE** causes the function to return a value only if there is an exact match between the **Lookup\_value** and the table entry.

## Exercise 40 - Continued

5. Click **OK**. The value returned is **10%**, corresponding to selling between 5 and 9 items.

	A	B	C	D	E	F
1	<b>Lookup Tables</b>					
2						
3		Price		£69.95		
4		Number Bought		5		
5						
6		<u>Total Price</u>		<u>£349.75</u>		
7						
8		Discount %		10%		
9		<u>Discount</u>		<u>£34.98</u>		
10		<u>Discount Price</u>		<u>£314.78</u>		

6. Change the number bought in **D4** to **23**. The **Discount %**, **Discount** and the **Discount Price** all change.
7. To use the **VLOOKUP** function, click in cell **D8** and delete the contents. Click the **Lookup & Reference** button and select **VLOOKUP** (this function is similar to **HLOOKUP** except the base data is stored in columns).
8. The **Lookup\_value** is cell **D4** (number bought). The **Table\_array** is **B19:C25** (the table without the labels) and the **Col\_index\_num** is **2** (to return the value from the 2nd column of the table).

Function Arguments

VLOOKUP

**Lookup\_value** D4 = 23

**Table\_array** B19:C25 = {1,0;5,0.1;10,0.15;20,0.25;30,0.4;...}

**Col\_index\_num** 2 = 2

**Range\_lookup** = logical

= 0.25

Looks for a value in the leftmost column of a table, and then returns a value in the same row from a column you specify. By default, the table must be sorted in an ascending order.

**Col\_index\_num** is the column number in table\_array from which the matching value should be returned. The first column of values in the table is column 1.

Formula result = 25%

[Help on this function](#)

OK Cancel

9. Click **OK** to complete the function.
10. Change the number bought in **D4** to **52**. The **Discount %** changes to **45%** the **Discount Price** is **£2000.57**.
11. Close the workbook without saving



## Exercise 41 - Statistical Functions

### Knowledge:

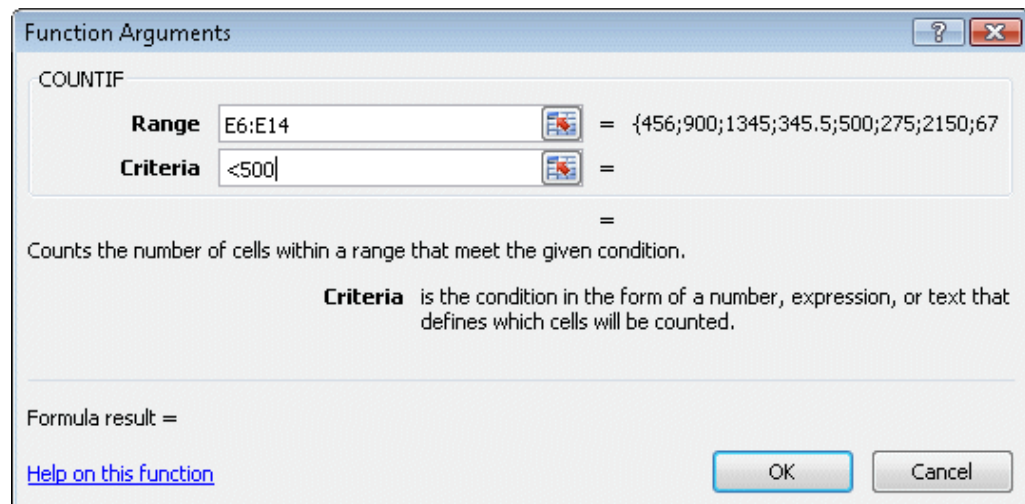
**Statistical** functions deal with analysing numerical data, from simple counting and averaging to calculating complex distribution parameters.

There are over 80 different functions within the **Statistical** category, from the simple, **AVERAGE**, **COUNT**, **MAX** **MIN** to more involved, such as, **FREQUENCY**, **TREND**, **COUNTIF**, **GROWTH** to the more complex, such as **VAR** (Variance) and **STDEV** (Standard Deviation).

All the functions are easy to construct and produce a solution, the problem with them is understanding what they do.

### Activity:

1. Open the workbook **Invoice**. The statistical function we are covering here is **COUNTIF**. **COUNTIF** counts numeric items that match a set condition, e.g. to count the number of clients that owe more than £100.
2. Click in cell **D16** and enter the label **Invoices under £500**.
3. Click in cell **E16**. Click the **More Functions** button then **Statistical** and **COUNTIF**.
4. In the **COUNTIF** box select the **Range** as **E6:E14**.
5. Set the criteria in the **Criteria** box to **<500**.



6. Click **OK**. Check the **Formula Bar** for the formula (the speech marks are added automatically). The cells that match the condition are counted.
7. Leave the workbook open.

## Exercise 42 - Maths & Trig Functions

### Knowledge:

**Math & Trig** functions deal with processing individual numerical data, from simple rounding to complex trigonometric calculations. Some useful functions are: **INT**, **ROUND**, **SUMIF** and **SUBTOTAL**.

**SUBTOTAL** acts on displayed rows when filtering lists. It performs various other functions within it, using **Function\_num** as a value matching the required one. The eleven numbers are:

1	AVERAGE	5	MIN	9	SUM
2	COUNT	6	PRODUCT	10	VAR
3	COUNTA	7	STDEV	11	VARP
4	MAX	8	STDEVP		

### Activity:

1. The workbook **Invoice** should be open, if not open it.
2. In the previous exercise cells matching a set criteria were counted. These cells can also be summed using **SUMIF**. In cell **D17**, enter the label **Small invoices total**.
3. In cell **E17** click the **Math & Trig** button then select **SUMIF**.
4. Select the **Range** as **E6:E14**. Set the criteria in the **Criteria** box as **<500**.
5. Click **OK** to paste the function. The invoices that are under £500 are summed. The formula is similar to **COUNTIF** except that the cells are added.
6. Close the workbook without saving.
7. Open the workbook **List**. The worksheet data ends at row **225**.
8. Move to cell **F226**. Click **Math & Trig** and select **SUBTOTAL**.
9. **Function\_num** is the number associated with the function. Type **9** (for sum, see the list at the top of the page).
10. **Ref1** is the range to act on. Type or select **F6:F225** (further references can be added if required, using **Ref2**, etc.).
11. Click **OK** to complete the function. There should be **44** replies in the whole list.
12. With the active cell in the list, click the **Filter** button on the **Data** tab to apply the **AutoFilter**. Filter **Town** and select only **Sunderland**. The **Subtotal** now shows the number of replies in the filtered list.

## Exercise 42 - Continued

13. In cell **D226**, enter the **SUBTOTAL** function to find the **Average** age of the people in the filtered list. The **Function\_num** is **1** and the **Ref1** is the full range **D6:D225**.
14. Click **OK** to complete the function. The answer should be **50.78**.
15. To make use of this information, **SUBTOTAL** can be used with the basic functions **Sum**, **Count**, **Average**, etc. In cell **E228**, enter the label **Replies** and in cell **F228** enter the function **=COUNT(F6:F225)**.
16. In cell **E229**, enter the label **Responses** and in **F229**, the formula **=F226** (the **SubTotal**). The answer should be **17**.
17. In cell **E230**, enter the label **Percentage** and in **F230**, the formula **=F229/F228**. Format the cell as a percentage, with 0 decimal places. This displays the filtered list replies as a percentage of the total replies. The answer should be **39%**.
18. Filter the list for a different **Town**, **Newcastle** and check the formulas at the bottom. There should be **5** replies from **Newcastle**, **11%** of the total replies.

**Note:** Care should be taken when using rows at the bottom of a list, as new records may be added. If a list may be expanded in the future, place the calculations to the right of the list or on another sheet.

19. Close the workbook without saving.
20. Open the workbook **Personnel** and apply the **AutoFilter**.
21. Filter **Administration** from the **Department** column.
22. Click on cell **H23** and click the **AutoSum** button. Because the list is filtered, the **SUBTOTAL** function is added automatically by the **SUM** function.

**Note:** Check the range to make sure that it covers all the filtered records, if using it for other filters.

23. Select **Select All** from the **Department** filter. The formula shows a total of all the absences.
24. Filter the list to show a different department.
25. Close the workbook without saving.

## Exercise 43 - Nested Functions

### Knowledge:

Individual functions can be combined with each other to form more complex functions. When one of the values within a function is itself a function, this is known as a **Nested Function**. An example of a nested text function is **=UPPER(LEFT(B2,3))**, which would return the upper case of the left three characters in the cell **B2**.

A common use for nested functions is in the **IF** function, where the logical test, e.g. **A1>10**, can be replaced by a logical function, e.g. **AND(A1>10,A1<20)**.

It is vital that the nested function returns a value of the same type as required by the first function or an error will result. In the above examples, **LEFT** returns a text field, which is required for the **UPPER** function; **AND** returns a logical value (TRUE or FALSE) which is required as the first value for the **IF** function.

### Activity:

1. Open the workbook **Absences**.
2. It is decided to pay a £15 bonus to all employees over 40 who have had less than 2 days absence this year.
3. Enter the label **Bonus** in cell **G1** and right align the label.
4. Select cell **G2** and click the **Logical** button from the **Formulas** tab and select **IF**.
5. In the **Logical\_test** field enter the function **AND(E2>=40,F2<2)**. This **AND** checks for the age being **40** or over **and** the absence being less than **2** days.
6. Enter **15** in the **Value\_if\_true** field and **0** in the **Value\_if\_false**.
7. Click **OK** to enter the function.
8. Check the **Formula Bar** for the completed function in **G2**:  
**=IF(AND(E2>=40,F2<2),15,0)**
9. Copy the nested function from **G2** to the range **G3** to **G20** to see who qualifies for the bonus.
10. Close the workbook without saving.

## Exercise 44 - Array Formulas

### Knowledge:

**Array Formulas** perform calculations on all the elements of an array of data and return either a single value or multiple values depending on the function. All array formulas are displayed with { }, which are automatically added. Multiple value formula are identical over the whole range and individual cells within the range cannot be edited or deleted.

### Activity:

1. Open the workbook **Sales Trend**. This is a spreadsheet showing actual sales in row 4 and row 5 is to display the trend in the sales figures.
2. Highlight the range **B5:F5** and type the following function **=TREND(B4:F4)**.
3. To enter the function as an array into the highlighted range hold down **<Ctrl>** and **<Shift>** and press **<Enter>**. The array is created.

B5		fx {=TREND(B4:F4)}					
	A	B	C	D	E	F	G
1	<b>Sales Trend</b>						
2							
3		Jan	Feb	Mar	Apr	May	
4	Actual Sales	100	190	289	345	502	
5	Trend in the Sales	93.4	189.3	285.2	381.1	477	
6							

4. Click on each cell in the range **B5:F5**, the formula is the same.
5. Click on cell **C5** and delete the cell contents. An error message is displayed, as part of an **Array** cannot be changed.

**Note:** The entire array has to be selected to format or delete it.

6. Close the workbook without saving.


## Exercise 45 - Formulas that Produce Errors

### Knowledge:

When some formulas are created they produce errors. When a formula cannot be calculated, the cell displays an error message. All error values begin with a #. The following are the error types with their associated number:

#NULL!	1	The two areas specified do not intersect
#DIV/0!	2	Division by zero
#VALUE!	3	The wrong argument used
#REF!	4	Cell referenced is not valid
#NAME?	5	Does not recognise text in a formula
#NUM!	6	Error with number in formula
#N/A	7	The value used in the formula is not available
#####		The result is too long to fit into the cell. A <b>Tooltip</b> shows the actual contents of a cell. This is a display error only.

### Activity:

1. Start a new workbook.
2. In cell **B10**, enter the number **5** and in **C10**, enter the number **2**.
3. In cell **D10**, enter the formula to divide the two numbers, i.e. **=B10/C10**.
4. Change the number in cell **C10** to **0** (zero). This produces a **#DIV/0!** error in cell **D10**. Click on cell **C10** then move the cursor over the error icon  to see an explanation. Click on the icon to see some options.
5. The function **ERROR.TYPE** can also be used to identify the type of error. In cell **E10**, enter **=ERROR.TYPE(D10)**. The result is error type **2**.
6. Delete the contents of cell **E10**.
7. Using the function **IF** can prevent some errors. Click on cell **D10** and enter the formula **=IF(C10=0,0,B10/C10)**. The formula is only calculated when the value in cell **C10** is not **0**. If **C10** is zero, the formula is not calculated and a value of zero will be used as the result.

**Note:** This replacement of the error is performed because if the **#Error** remains and it is in the middle of a range, any calculation on the range will display the same error message.

8. Change the formula in **D10** to **=IF(C10=0,"error",B10/C10)**. This will display the message **error** if **C10** is zero, without calculating the formula.
9. Save the workbook as **errors** and then close it.

## Exercise 46 - Develop Your Skills

You will find a *Develop Your Skills* exercise at the end of each Skill Set. Work through it to ensure you've understood the previous exercises.

1. Open the workbook **Hotel Outline**.
2. Add an **Auto Outline** to the worksheet.
3. Display the row level **3**.
4. Set the display to **Landscape**, fit to one page and print a copy.
5. Remove the **Auto Outline**.
6. Create a manual outline by grouping rows **4** to **13** and rows **16** to **27**. Add another row level by grouping rows **4** to **31**.
7. Group columns **B** to **M**, collapse the columns and then collapse the rows.
8. Display the hidden columns. Print a copy of the outlined worksheet.
9. Remove the **Outline** on rows **4** to **13**. Clear all the outlines and close the workbook without saving.
10. Open the workbook **kitchen36** (created in an earlier exercise or from the **Solutions** folder).
11. The main formulas in **Order Details** can now be added. Display the **Prices** sheet. The prices for the items are found by looking them up from this sheet, the lookup table is the range **A4:H36** and is fixed, e.g. **\$A\$4:\$H\$36**.
12. Display the **Order Details** sheet. Click in cell **E8**. The formula is to be a nested function. The price is only entered if the type is greater than 1 (none) and the quantity is greater than 0, **AND(\$C\$5>1,D8>0)**. The lookup function uses the **Reference** in column **A** as the **Lookup\_value** and **C5** (type) **+2** as the column to look up from the matching price - see the **Types** sheet then **Prices**.
13. Enter the formula in **E8**:  
**=IF(AND(\$C\$5>1,D8>0), VLOOKUP(A8,Prices!\$A\$4:\$H\$36,\$C\$5+2),0)**

**Note:** *The type of kitchen in cell **C5** and the **Lookup Table** are absolute references. The type of kitchen in cell **C5** is selected later using a drop down list.*

14. Replicate the formula from **E8** down to **E40**.
15. Enter a number (from **2** to **6**) for the kitchen type in cell **C5** and some test data in column **D** (number of units) to check that the formulas work. Use the **Types** sheet to match the type and then the **Prices** sheet to check that the correct values have been used.

## Exercise 46 - Continued

16. On the **Order Details** sheet, select cell **F8** and enter a formula to multiply **Quantity** by **Price**, **=D8\*E8**. Replicate the formula from **F8** down to **F40**.
17. In cell **F41** use the **SUM** function to total the prices.

**Note:** *Testing the functionality of the spreadsheets will be performed later after the structure has been completed.*

18. In cell **C41** enter the text **Units (excluding accessories)**. Format the text **bold** and **right align** it.
19. In cell **D41** sum the range **D8:D36**. Format **bold** and **centre**.
20. A formula is to be placed in cell **F42** that will represent an amount of discount of **10%** on orders **£5,000** or over. Enter **=IF(F41>=5000,F41\*0.1,0)** as the formula. Right align cell **F42**. Edit the formula in **F42** to replace the **0.1** with the link to cell **B10** on the **Types** worksheet. Make the reference to **B10** in the formula absolute.
21. In cell **F43** calculate the **Grand Total**, the sub total minus the discount.
22. Change the **Total Price** column to currency format, range **F8:F43**.
23. In **E4** create the customer reference, using **CONCATENATE** (a **Text** function) to combine the customers initials from cells **C4** and **B4** and the postcode in cell **D4** (separate the initials from the postcode with a **/**, remembering to include speech marks around it).
24. Test this formula by adding your name and postcode to the range **B4:D4**.
25. To save entering the current date for every customer, add the **NOW** function to cell **F5**. Format the date in cell **F5** to be **dd/mm/yy**.
26. To make the worksheet less cluttered the display of zeros can be suppressed. Click the **File** tab then **Options** and in the **Advanced** section under **Display options for this worksheet** uncheck **Show a zero in cells that have zero value**. Click **OK**. Zeros are now not displayed on the worksheet making it easier to use.
27. One other minor problem is that the **Discount** and the **Grand Total** in conjunction with **Sub Total** are sometimes **1** penny out, because of the accuracy of the calculation. The **INT** (Integer) function can be used to remove the pennies from the **Discount** so that is always a whole number.
28. Amend the formula in cell **F42** to remove the pennies from the **Discount**:

**=IF(F41>=5000,INT(F41\*Types!\$B\$10),0)**



## Exercise 46 - Continued

29. To test the calculations enter the following order:

	A	B	C	D	E	F
5		<b>Style of Units</b>		6	<b>Date</b>	30/09/08
6						
7	<b>Ref</b>	<b>Unit</b>	<b>Description</b>	<b>Quantity</b>	<b>Price</b>	<b>Total Price</b>
8	1	300 BASE	Base Unit			
9	2	600 BASE	Base Unit	3	273	£819.00
10	3	900 BASE	Base Unit	2	210	£420.00
11	4	1200 BASE	Base Unit			
12	5	600x600 CORNER UNIT	Corner Unit	2	343	£686.00
13	6	900x900 CORNER UNIT	Corner Unit	1	394	£394.00
14	7	4 DRAWER PACKx300	Drawer Unit			
15	8	4 DRAWER PACKx600	Drawer Unit	2	347	£694.00
16	9	5DRAWER PACKx300	Drawer Unit			
17	10	5DRAWER PACKx600	Drawer Unit			
18	11	570x300 WALL UNITS	Wall Unit	4	203	£812.00
19	12	570x600 WALL UNITS	Wall Unit			
20	13	570x1200 WALL UNITS	Wall Unit	2	333	£666.00
21	14	720x300 WALL UNITS	Wall Unit			
22	15	720x600 WALL UNITS	Wall Unit			
23	16	720x900 WALL UNITS	Wall Unit			
24	17	720x1200 WALL UNITS	Wall Unit			
25	18	900x300 WALL UNITS	Wall Unit			
26	19	900x600 WALL UNITS	Wall Unit			
27	20	900x900 WALL UNITS	Wall Unit			
28	21	900x1200 WALL UNITS	Wall Unit			
29	22	600 OVEN HOUSING (built under)	Oven Housing	1	324	£324.00
30	23	1985x600 OVEN HOUSING	Oven Housing			
31	24	300 LARDER UNITS	Larder Unit	1	350	£350.00
32	25	400x2130 SHELVED	Shelving Unit			
33	26	300x1985 OPEN SHELVES	Shelving Unit			
34	27	300x2130 OPEN SHELVES	Shelving Unit	1	368	£368.00
35	28	570x300 END PANELS	End Panel			
36	29	715x396 OPEN SHELF	Shelving Unit			
37	30	WASTE BIN	Accessories			
38	31	TOWEL SPACE	Accessories			
39	32	DRAWERS FOR LARDER	Accessories	1	14	£14.00
40	33	LIGHTS	Accessories	5	16	£80.00
41		<b>Units (Excluding accessories)</b>		19	<b>Sub Total</b>	<b>£5,627.00</b>
42					<b>Discount</b>	<b>£562.00</b>
43					<b>Grand Total</b>	<b>£5,065.00</b>

30. Leave the data as entered, save the workbook as **kitchen46** and close it.
31. Open the workbook **Kitchen Finance**. An **Array** formula is to be created in a worksheet containing details of the company's turnover and kitchens sold over a ten year period. The formula will calculate the **Trend** (a linear sequence) for the turnover.
32. Cell **B4** should be the **Trend** cell for **1998**. Select the range of cells **B4:K4** and type the formula **=TREND(B3:K3)** but do not press **<Enter>**.
33. An **Array formula** is entered by holding down **<Ctrl Shift>** and pressing **<Enter>**. Press **<Ctrl Shift>** and **<Enter>** to create the single array formula. Check each cell in the range **B4:K4** and note that the formula is the same.
34. Save the workbook as **kitchen finance2** and close it.

## Summary: Outlines and Complex Functions

In this Skill Set you have created and worked with outlines.

You have also created automatic totals, complex functions and sorted out errors in formulas.

Your OCR ITQ evidence must demonstrate your ability to:

- Group and Outline data
  - Create outlines
  - Work with outlines
  
- Use formulas that meet calculation requirements:
  - Mathematical
  - Statistical
  - Financial
  - Logical
  - Look-up
  
- Understand:
  - Arguments
  - Arrays
  - Nested functions
  
- Sort out errors in formulas:
  - Check for errors
  - Use formulas for validating data