

Further Chart Operations

Introduction

This topic will cover some other types of chart plus using charts for goal seeking. It also reviews ways of plotting charts in three dimensions and reversing the chart axes.

Topic Objectives

- To add and remove values from a chart.
- To create area, embedded and 3-D column charts.
- To re-format and change 3-D charts.
- To change and reverse chart axes.
- To use the Excel Goal Seek feature in a chart.
- To add trendlines to a chart.

Changing the Scale of a Chart

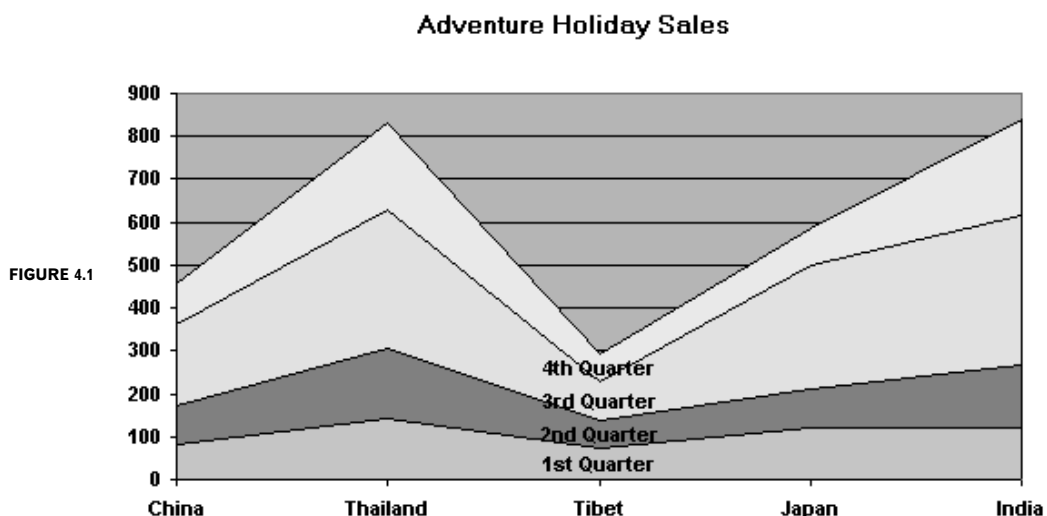
- 1 Select the chart **Line2** in the workbook **Adventure Holidays**. You will see that the lines for India and China are quite close together but we can improve the chart's readability by changing the default scale for the vertical axis. At the moment the minimum and maximum values for the vertical axis are 0 and 400.
- 2 Right click the vertical axis and select the options **FORMAT AXIS** then **SCALE**. Change the maximum and minimum values to 50 and 350. The chart values should be easier to compare. Review this by using the **EDIT-UNDO** and **RE-DO** commands.

Area Charts

Our next chart type is the area chart as shown in Figure 4.1. An area chart can be regarded as a number of line charts stacked on top of each other to form separate areas. It shows not just the trend in holidays sold for each country but the contribution of each country to overall sales.

- 1 Open the workbook **Adventure Holidays** if necessary. Select cells **A4** to **E10**, in the worksheet **Holiday Data**.
- 2 Create an area chart in ChartWizard, selecting sub-type 2.

- 3 At Step 3 of ChartWizard select the **DATA LABELS** tab then the **SERIES NAME** option.
- 4 At Step 4 of ChartWizard select the **AS NEW SHEET** option.
- 5 Use the **VIEW-SIZED WITH WINDOW** command to re-size the window.
- 6 Add a chart title using the **CHART-CHART OPTIONS** command.
- 7 Format all the chart text to 9 point bold – right click the white space around the chart and select **FORMAT CHART AREA**.



- 8 Name the chart **Area1**.

Removing and Adding Values to a Chart

- 1 In Excel it is straightforward to remove a range of chart values, eg a segment from a pie chart or an area from an area chart. It is equally easy to add a data range without needing to re-plot the whole chart.
- 2 **Removing Values.** Click once on the area for the 3rd quarter of the **Area1** chart (do not click on the area label). The area is enclosed in handles and the formula appears in the Formula Box with sheet name and absolute references added, eg `=SERIES('Holiday Data'!A9,'Holiday Data'!B4:E5,'Holiday Data'!B9:E9,4)`.
- 3 Press the **DELETE** key to delete Quarter 3 (**EDIT-UNDO CLEAR** will reverse a mistake).
- 4 **Adding Chart Values.** Select the cell range **D4–D10** in the worksheet **Holiday Data**. This is the data range that we have just deleted. Copy it using **EDIT-COPY**.

- 5 Select the chart sheet **Area1** and use the **EDIT-PASTE** command. The 3rd quarter values are pasted back into the chart but are incorrectly positioned.
- 6 **Changing the Position of a Data Series.** Click the third quarter area of the chart again so that it is selected – enclosed in selection handles. Take the options **FORMAT-SELECTED DATA SERIES** then the **SERIES ORDER** tab.
Select the 3rd Quarter and move it to its correct position.

Reversing the Axes on a Chart

The **Area1** chart plots the countries along the X or horizontal axis – these are our 5 categories. The number of holidays sold per quarter is plotted on the Y or vertical axis. However, we could find it useful to reverse the axes, ie to have the quarters along the X axis and the number of holidays sold shown on the Y axis. Comparing Figures 4.1 and 4.2 will make this distinction clear. Because the chart is based on 4 quarters and 5 countries Excel will make the smaller number the values and the larger number the categories as this is more readable. However, it is easy to reverse this either in a new chart or for an existing one.

- 1 Select cells **A4** to **E10** in the Holiday Sales worksheet. Click the **CHARTWIZARD** button.
Check that Area Chart sub-type 2 is still selected. Click the **NEXT** button.
- 2 **CHARTWIZARD-STEP 2** is displayed next; make sure that the **DATA RANGE** tab is selected.
- 3 Click the **ROWS** button and the chart axes are reversed. At **CHARTWIZARD-STEP4** select the **A5 NEW SHEET** option.
Click the **FINISH** button.
- 4 We now have 2 views of the same data:
Data Series in Columns – countries are categories, the quarters are plotted on the value axis – see Figure 4.1 above.
Data Series in Rows – the quarters are categories, the countries are plotted on the value axis – see Figure 4.2.
Note: You can reverse the axes for other chart types too.

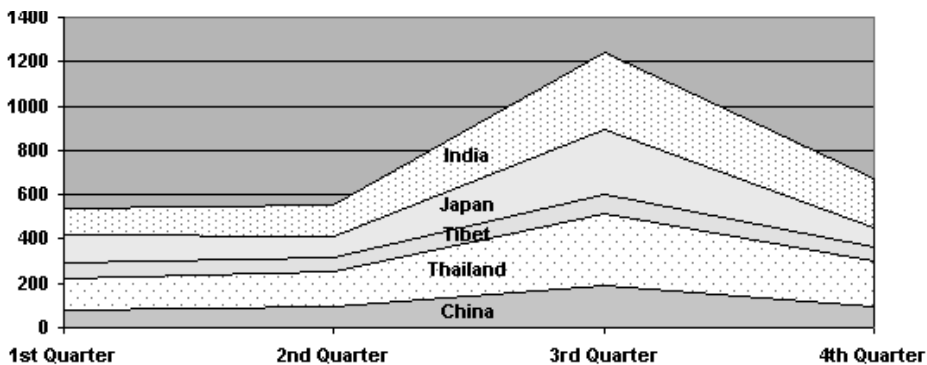


FIGURE 4.2

- 5 **Independent Activity.** Format the chart as before, naming the sheet Area 2.

Trendlines

- 1 Create the new workbook shown in Figure 4.3, naming it **Book Sales**.

FIGURE 4.3

	A	B	C	D	E
1			Book Sales		
2					
3	Month	No. Sold	Revenue	Advertising	
4	June	730	1990	180	
5	July	890	3030	305	
6	August	1055	3440	380	
7	September	1310	4421	640	
8	October	1600	5029	690	
9					
10					

- 2 Select cells **A3** to **D8** and create a standard column chart. Use the default settings for the chart axes, ie months as categories on the X axis. Select the options **VIEW-SIZED WITH WINDOW** and format the text labels as before.
- 3 Click on one of the columns – all the columns in the same category should now be selected. Take the options **CHART-ADD TRENDLINE-TYPE**. Select **LINEAR** and then the **ADVERTISING** series; a trendline is added to the chart.
We can use trendlines to highlight trends or relationships between different sets of chart values, eg the sales and revenue for book sales continue to rise while advertising costs level off.
- 4 Name the sheet **Trend1**.

Goal Seeking

- 1 We have seen that worksheet and chart data are dynamically linked, ie changes in the worksheet are reflected in the chart. The reverse is equally true – amending chart values will change the worksheet. Open the workbook **Adventure Holidays** and select the sheet **Holiday Data**.
- 2 Using the **CTRL** key select cell ranges **B4** to **F4** and **B12** to **F12**. Create a standard column chart, accepting the default axis settings. Name the sheet **Goal Seek**. Take the menu options **VIEW-SIZED WITH WINDOW**.
- 3 Execute the following steps:
 - (a) Click the 5th (total) column once.

- (b) Click again – the column should now be selected.
- (c) Place the pointer on the top of the column so that the pointer changes to a double-headed arrow. An information box will also open if the pointer is correctly positioned.
- (d) Drag the column upwards until the value equals 3300. A **GOAL SEEK** dialog box appears – see Figure 4.4 – and the worksheet is displayed instead of the chart.

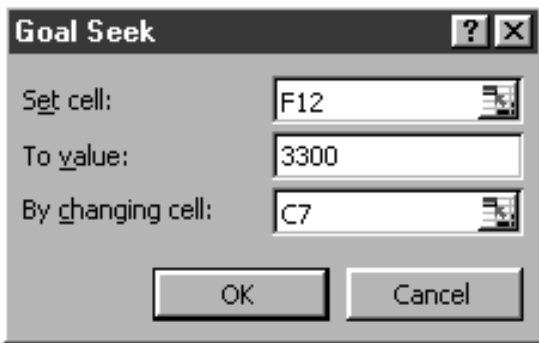


FIGURE 4.4

- 4 The idea now is to modify one of the cells in the range **B6 to E10** to achieve the sales goal of 3300 holidays sold. Complete the 'By changing cell' box as shown in Figure 4.4. Click **OK**.
The value of cell **C7** is changed to **456** – the number of holidays in Thailand you would need to sell to achieve the goal of 3300 in cell F12.
- 5 Click the **CANCEL** button on the dialog box to restore the cells to their previous values.
- 6 **Notes:** Goal seeking only works if the cell you change contains a value, not a formula. The cell whose value you set must also be related by a formula to the cell whose target value you are changing.
You can also goal seek in a worksheet – see page 72.

3-D Chart Concepts

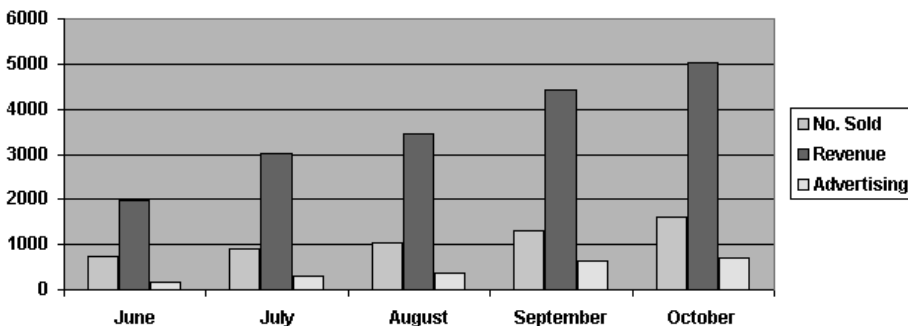
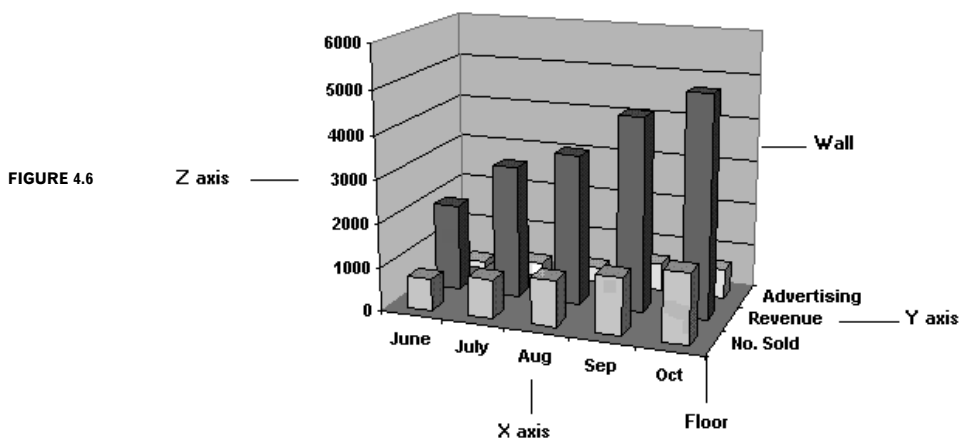


FIGURE 4.5

The column chart shown in Figure 4.5 displays two dimensions – the X axis showing the month categories and Y axis showing the data values.

The three dimensional chart shown in Figure 4.6 plots the same data in three dimensions. There is a third axis – the Z axis.



Briefly reviewing the different terminology for the 3-D chart:

The **X axis** remains the same – the category axis.

The **Y axis** becomes the new depth or inward axis now, plotting the three data series – No. Sold, Revenue, and Advertising.

The **Z axis** replaces Y as the value axis, showing the values for the three categories.

The 3-D chart has a base or floor and background walls.

Note: Excel offers 3-D versions of many of its chart types but not all of them offer a genuine third axis; some merely use three dimensions for visual effect.

Creating a 3-D Column Chart

- 1 Open the workbook **Book Sales** and make **Sheet1** the active sheet.
- 2 Select cells **A3** to **D8** and choose a column chart, sub-type 7 (3-D Column) in Excel. Name the chart sheet **3-D Column**.
 Select the options **VIEW-SIZED WITH WINDOW** and format the text labels as before.
 Your chart should now resemble Figure 4.6 above. Name it **3-D Column**.

3-D Chart – Formatting

- 1 **Changing Column Ordering.** We will bring the Advertising columns to the front so that they are not obscured by taller columns. Click one of the

Advertising columns and select the options **FORMAT-SELECTED DATA SERIES** then select the **SERIES ORDER** tab.

Select **ADVERTISING** in the **SERIES ORDER** box, then use the **MOVE UP** button to move Advertising to the front of the chart.

- 2 **Chart Title.** Add a chart title using the options **CHART-CHART OPTIONS-TITLES**.

Add the title **'Book Sales Analysis'**.

- 3 **Note:** Use the same Insert and Format options as you would for 2-D charts. The ChartWizard button also offers the same options as before.

Selecting the Viewing Angle for a 3-D Chart

If you change the angle at which you view the 3-D data you can emphasise different elements of the chart. You can click and drag the elements directly or use a formatting menu which allows for more precise adjustment.

- 1 With the chart **3-D Column** the active sheet take the options **CHART-3-D VIEW**.
- 2 The dialog box appears as shown in Figure 4.7; you may need to drag it to one side (use the Title Bar) to see the chart.

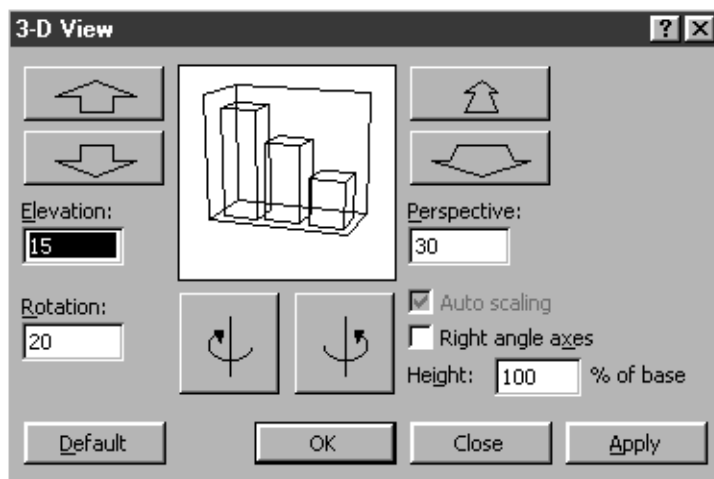


FIGURE 4.7

Try the following settings:

- (a) Use the **UP** and **DOWN** arrow buttons above the **ELEVATION** box to vary the height at which you view the columns. Use the **APPLY** button to apply the new setting to the chart then the **DEFAULT** button to restore the standard setting.
- (b) Use the **UP** and **DOWN** arrow buttons above the **PERSPECTIVE** box to vary the 3-dimensional depth or perspective. As before use the **APPLY**

button to apply the new setting to the chart then the **DEFAULT** button to restore the standard setting.

- (c) Use the rotation arrow buttons next to the **ROTATION** box to rotate the chart about its vertical axis. As before use the **APPLY** button to apply the new setting to the chart then the **DEFAULT** button to restore the standard setting.
- (d) Amend the **HEIGHT % OF BASE** figure to 55 to alter the height of the chart relative to the base. As before use the **APPLY** button to apply the new setting to the chart then the **DEFAULT** button to restore the standard setting.
Close the dialog box.

Creating Embedded Charts

Instead of creating a chart in its own separate sheet we can embed it in the worksheet that it relates to. This is useful in saving space; it also allows you to view or print the chart and worksheet as one sheet.

- 1 Open the workbook **Insurance Sales** and select cell range **A3** to **D6**.
- 2 Create a standard bar chart. At ChartWizard Step 4 leave the option **AS OBJECT IN** selected and click **FINISH**.
- 3 **Notes:** Chart and worksheet can be selected in turn by clicking. When one of the bars on the chart is selected Excel's Range Finder will highlight the associated cells in the worksheet. The embedded chart can be moved or re-sized by dragging the selection handles.
- 4 **Drag and Drop** as a technique is used extensively in Excel; you can 'drag' a range of cells to select them and then 'drop' them onto a chart; this is particularly easy when the chart is embedded. Select cell range **A8** to **D8** in the worksheet and locate the mouse pointer on the edge of this selected range as shown in Figure 4.8.

8	Average Sales per Quarter	672	196	155
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FIGURE 4.8

locate cursor on bottom of row and drag

Now simply drag the cell range (shown as a dotted rectangle) onto the chart – it now includes this fourth set of values.

- 5 **Notes:**
 - (a) Use **EDIT-UNDO** to correct a mistake.

- (b) Embedded charts can be formatted in the usual way - right click or double click the appropriate chart component.
- (c) To place an embedded chart in a separate window temporarily, first select it then take the options **VIEW-CHART WINDOW**.
- (d) To transfer an embedded chart to its own separate sheet open ChartWizard and at Step 4 select **AS NEW SHEET**.
- (e) Delete an embedded chart by selecting it and pressing the **DELETE** key.

Independent Tasks

You may like to try out some other chart types that we have not covered; here are some ideas:

- 1 **Custom Charts.** Select the 10 cells shown in Figure 4.9. and start ChartWizard. At Step 1 click the **CUSTOM TYPES** tab and take time to preview the custom charts in the list. Some are highly formatted versions of standard chart types; others offer black and white formats – useful for monochrome printers. Other formats offer unusual ways of charting data that can sometimes be useful.
- 2 **Doughnut Charts.** A doughnut chart is similar to a pie chart but can show more than one data range. Construct one for the three months June to August (ie cell range A3 to D6) in the Book Sales workbook.