How to

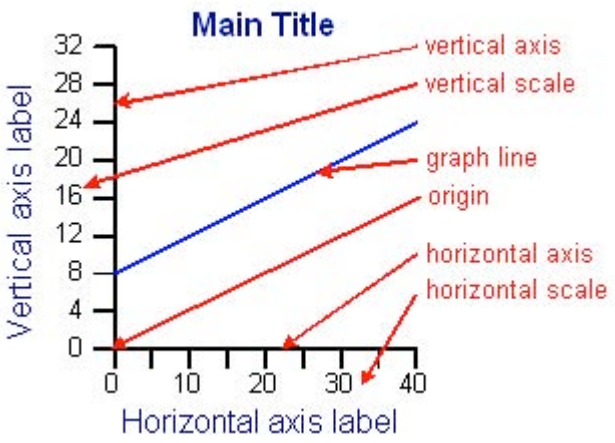
…read graphs

Graphs are diagrams with lines or curves that are used to represent various kinds of statistical information. Graphs may show:

- relationships – for example, between the number of clients in a home and referrals to medical services
- trends – for example, a client's blood pressure over time.

Components of a line graph

The following diagram shows the main components of a line graph.



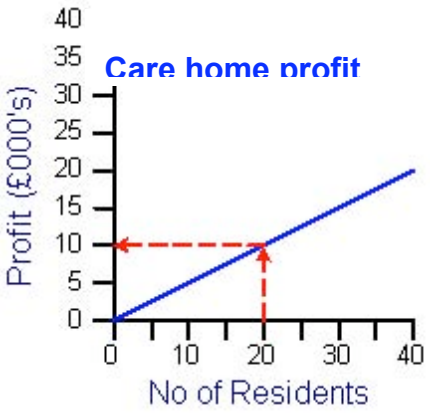
The *origin* is the name given to the intersection of the horizontal and vertical axes. Most graphs (but not all) will show the axes intersecting where both scales are zero.

You may also have seen graphs where the axes are labelled *x* and *y*. This is a convention in mathematics where *x* is the symbol for the horizontal axis and *y* the symbol for the vertical axis.

Reading a graph

The graph below shows the profit made by a care home, plotted against the number of residents. We can determine the profit per resident by reading off a pair of values from the graph line.

To do this, first choose a convenient value along the horizontal axis, in this example the value '20'. Draw a line vertically upwards to meet the graph line, and from that point draw a horizontal line to the vertical axis.

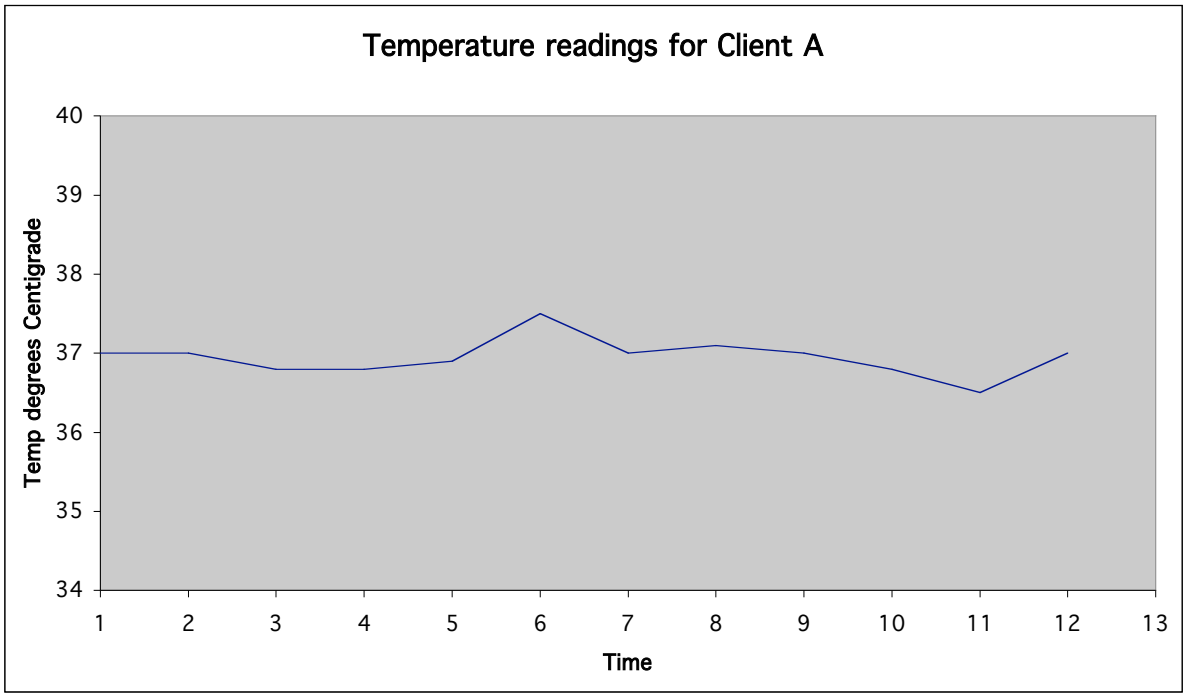


Read off the value on the vertical axis. In this example the value is 10 but the scale is in thousands, so the actual value is ten thousand.

Therefore the profit per resident is given by:

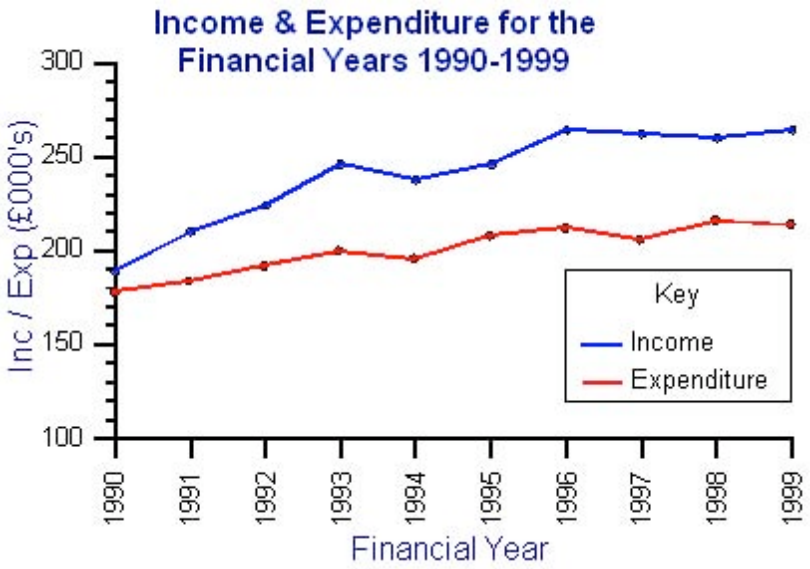
$$\text{Profit per resident} = \frac{10000}{20} = £500$$

The following graph shows how a client's temperature changed over a 12-hour period. You can see that there was a slight increase at 6 o'clock and a slight decrease at 11 o'clock.



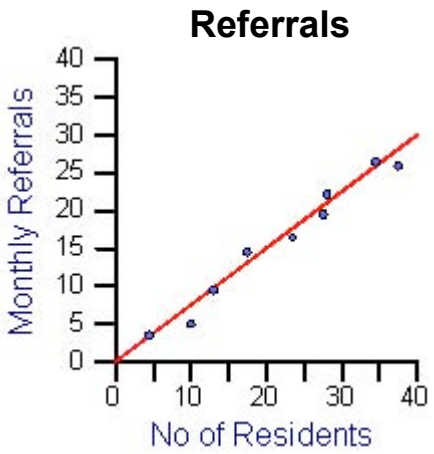
Graphs with more than one variable

The following graph shows both the income and expenditure for a care home from 1990 to 1999.



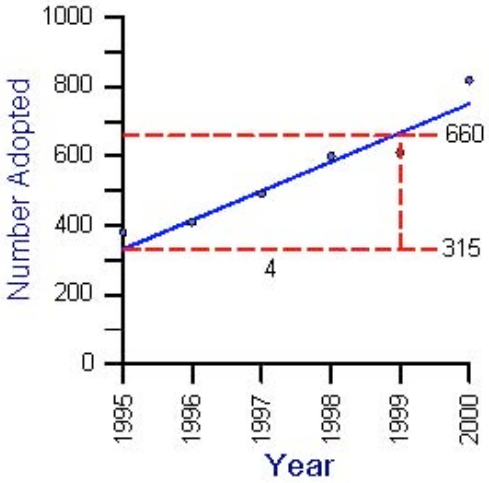
Scatter graphs

In the real world, data collected by survey or analysis is seldom so well behaved that it gives a perfectly straight-line relationship. The following graph shows the relation between the number of residents in a care home and the monthly referral rate to external medical support services. The pairs of points do not fall in a perfect straight line. We call this a scatter graph. We can see that the points almost fall in a straight line, and it is often possible to draw a straight line through or close to most of the points. We call this the *line of best fit*:



Calculating a change

This example shows the increase in the number of adoptions from care for the years 1995 to 2000. To calculate the increase, you select a timespan and read off the corresponding values for the number of children adopted:



The time chosen is four years along the base (1995-1999).

The increase = 660 – 315 = 345

Therefore the rate of increase =

$\frac{345}{4}$ = 86.25 children/year

We could round this value to the nearest 5 and quote a value of 85 children per year.

Try these!

Search the local press for examples of different types of graph.

From the following graph, what was the care home's income and expenditure in 1993?