



## Graphs of real-life situations

- Knowing the properties of direct proportionality
- Using graphs to find the relationship between two variables
- Writing a ratio in the form 1 : n
- Converting a ratio to an equation linking two variables

Keywords

You should know

explanation 1a

explanation 1b

- 1** In February 2008, the exchange rate between pounds (£) and Japanese yen (¥) was approximately 1 : 210. Therefore £1 could be exchanged for ¥210.

- a** Copy and complete the exchange rate table.

<b>Pounds (£)</b>	0	5	10	15	20
<b>Japanese yen (¥)</b>					

- b** Plot a graph showing the relationship between pounds and yen.

- 2** In August 2007, the exchange rate between pounds (£) and euros (€) was approximately 2 : 3. Therefore £2 could be exchanged for 3€.

- a** Copy and complete the following exchange rate table.

<b>Pounds (£)</b>	0	10	20	50	100
<b>Euros (€)</b>		15			

- b** Plot a graph to show the relationship between pounds and euros.

By February 2008, the exchange rate had changed and pounds to euros was approximately 1 : 1.35.

- c** On the same axes plot the new graph showing the relationship between pounds and euros.
- d** How many less euros would a person get for exchanging £300 in August 2007 compared with February 2008?

- 3** A car is driving at a constant speed. The table shows the total number of kilometres the car has travelled at different points in time.

<b>Time (h)</b>	0	1.5	3	4.5	6
<b>Distance (km)</b>		135		405	

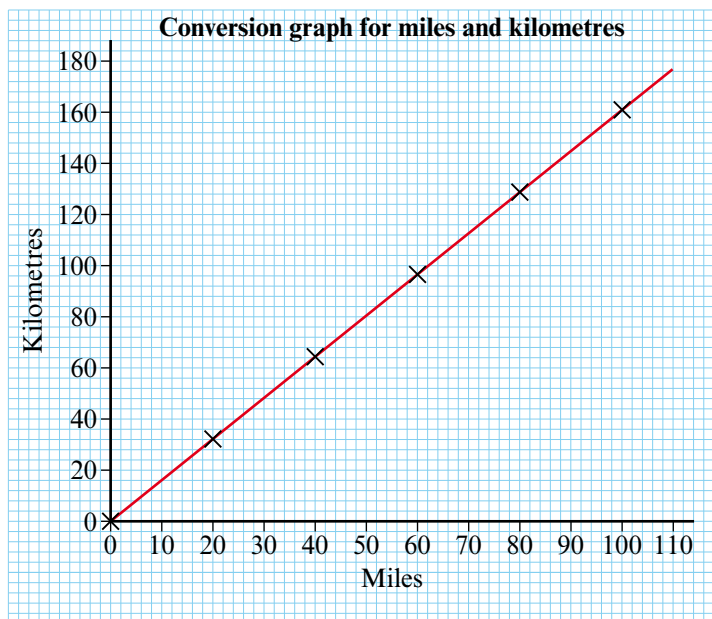
- Calculate the speed, in km/h of the car.
- Copy and complete the table.
- Plot a graph showing the relationship between time and distance travelled.
- Use your graph to estimate the distance travelled after 3 hours 45 minutes.

explanation 2a

explanation 2b

explanation 2c

- 4** This graph can be used to convert between miles and kilometres.



- From the graph find the number of kilometres equivalent to 100 miles.
- Find the number of kilometres in 1 mile.
- Calculate the number of kilometres equivalent to 70 miles.  
Show your working clearly.
- Use the graph to help you find the number of miles equivalent to 250 km.  
Show your working clearly.

**5** Write each of the following ratios in the form  $1:n$

**a**  $2:5$

**b**  $3:10$

**c**  $4:5$

**d**  $9:15$

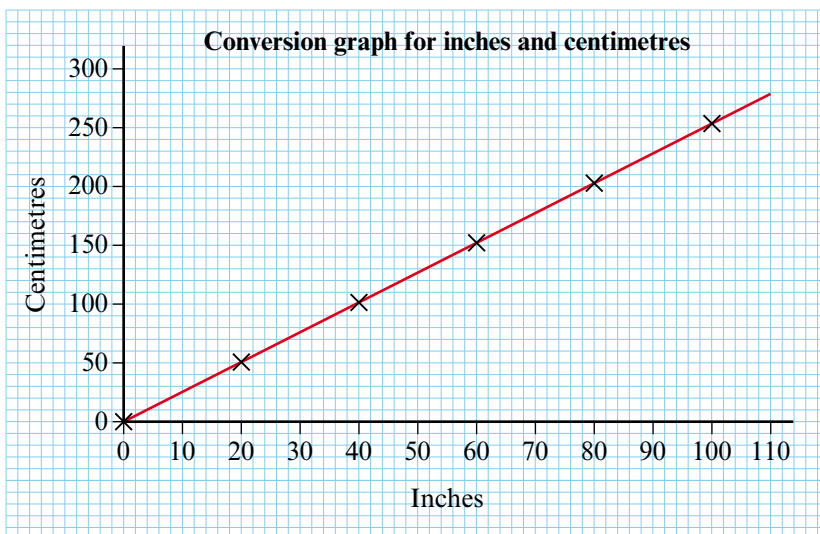
**e**  $15:6$

**f**  $25:6$

**g**  $1.5:1$

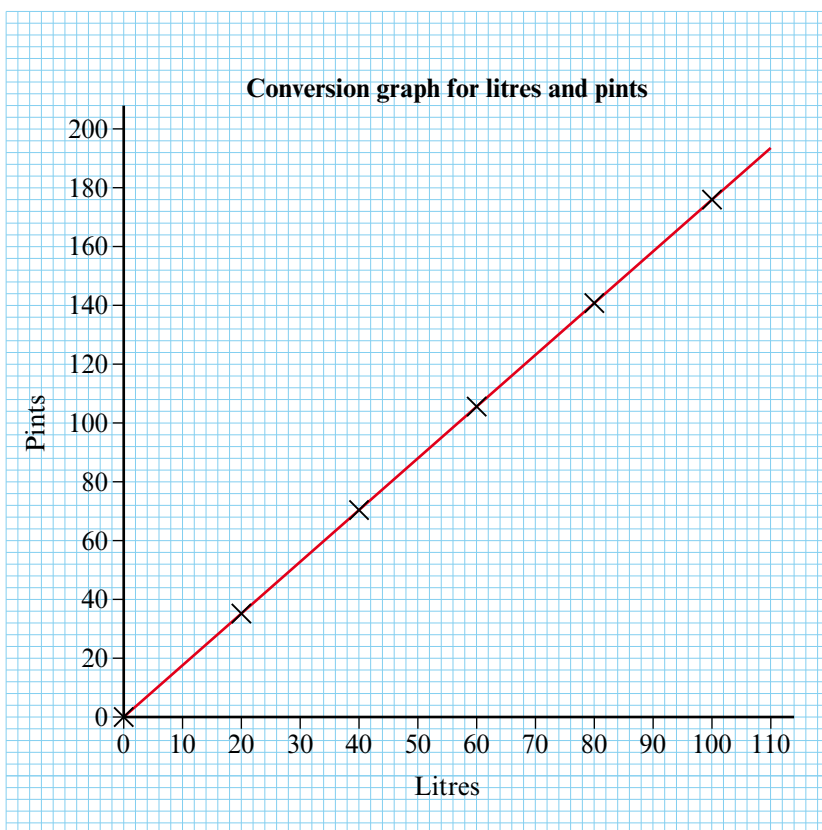
**h**  $9:5$

**6** The graph below shows the conversion between inches and centimetres.



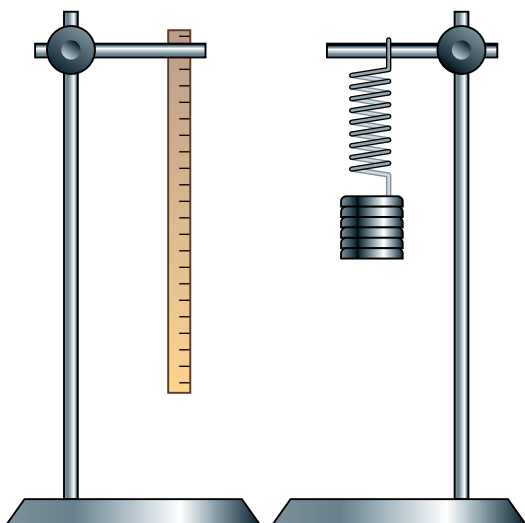
- a** Use the graph to find the number of centimetres equivalent to 50 inches.
- b** Calculate the number of centimetres equivalent to 1 inch.
- c** Write the ratio number of inches : number of centimetres in the form  $1:n$ .
- d** Calculate the number of centimetres equivalent to 85 inches.
- e** Use the graph to find the number of inches equivalent to 100 cm.
- f** Calculate the number of inches equivalent to 1 cm.
- g** Write the ratio number of centimetres : number of inches in the form  $1:n$ .
- h** Calculate the number of inches equivalent to 1.75 m.

**7** The graph below shows the conversion between litres and pints.



- a** Use the graph to find the number of pints equivalent to 50 litres.
- b** Calculate the number of pints equivalent to 1 litre.
- c** Write the ratio number of litres : number of pints in the form  $1 : n$ .
- d** Calculate the number of pints equivalent to 72 litres.
- e** Use the graph to help you find the number of litres equivalent to 1 pint.
- f** Write the ratio number of pints : number of litres in the form  $1 : n$ .
- g** Write the relationship between a capacity in litres,  $L$ , and the equivalent capacity in pints,  $P$ , as an equation.
- h** In 1995, the average yearly milk yield for a dairy cow in the UK was 11 000 pints.  
Convert the average yearly milk yield to litres.

- 8** An experiment is conducted to find the relationship between the mass, in grams, attached to a spring and its extension, measured in centimetres. The apparatus is set up as shown.



The results from the experiment are shown in the table below.

Mass (g)	Extension (cm)
0	0
10	2.1
20	3.9
30	6.2
50	10.3
100	18.8

- Plot a graph showing the results and draw a line of best fit.
- What is the approximate relationship between mass and extension?
- Write the relationship between the mass ( $M$ ) and the extension ( $E$ ) as an equation.