

What do I need to be able to do?

By the end of this unit you should be able to:

- Solve problems and explain direct proportion
- Use conversion graphs to make statements, comparisons and form conclusions
- Understand and use scale factors for length

Keywords

- Proportion:** a statement that links two ratios
- Variable:** a part that the value can be changed
- Axes:** horizontal and vertical lines that a graph is plotted around
- Approximation:** an estimate for a value
- Scale Factor:** the multiple that increases/ decreases a shape in size
- Currency:** the system of money used in a particular country
- Conversion:** the process of changing one variable to another
- Scale:** the comparison of something drawn to its actual size.

Direct Proportion

As one variable changes the other changes at the same rate.



4 cans of pop = £2.40

$\times 0.5$
4 cans of pop = £2.40
 \rightarrow
2 cans of pop = £1.20

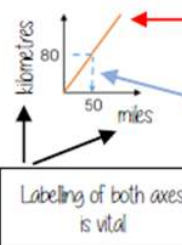
This is a multiplicative change
4 cans of pop = £2.40
 $\times 3$
12 cans of pop = £7.20

Sometimes this is easiest if you work out how much one unit is worth first
e.g. 1 can of pop = £0.60

This multiplier is the same in the same way that this would be for ratio

Conversion Graphs

Compare two variables



This is always a straight line because as one variable increases so does the other at the same rate

To make conversions between units you need to find the point to compare – then find the associated point by using your graph
Using a ruler helps for accuracy
Showing your conversion lines help as a "check" for solutions

Labelling of both axes is vital

Conversion between currencies



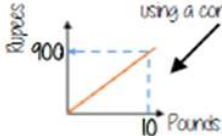
£1 = 90 Rupees

Currency is directly proportional

For every £1 I have 90 Rupees

$\times 10$
£1 - 90 Rupees
 \rightarrow
£10 - 900 Rupees

Currency can be converted using a conversion graph



Convert 630 Rupees into Pounds

$\times 7$
£1 - 90 Rupees
 \rightarrow
£7 - 630 Rupees

Ratio between similar shapes



Angles in similar shapes do not change
e.g. if a triangle gets bigger the angles can not go above 180°

The two rectangles are similar.

3m 8m

45m 7m

Corresponding sides

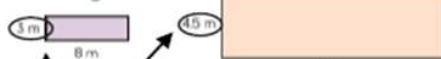
$\times 1.5$
3m : 4.5m
 \rightarrow
1m : 1.5m

$\times 0.15$
45m : 7m
 \rightarrow
1m : 1.5m

Note
Simplify to the same ratio

Understand Scale Factor

The two rectangles are similar.



$3 \times 15 = 4.5$
This is a multiplicative change

Use corresponding sides to calculate a scale factor

Missing length
 $8 \times 1.5 = 12m$

Scale factor can also be calculated by

$\frac{\text{Bigger corresponding side}}{\text{Smaller corresponding side}}$

Small corresponding side \times SF \rightarrow Big corresponding side
Big corresponding side \div SF \rightarrow Small corresponding side

Draw and interpret scale diagrams

A picture of a car is drawn with a scale of 1:30

For every 1cm on my image is 30cm in real life.

The car image is 10cm

Image : Real life
1cm : 30cm
 \rightarrow
10cm : 300cm

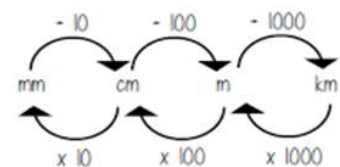


The car in real life is 210cm

Image : Real life
1cm : 30cm
 \rightarrow
7cm : 210cm



Interpret maps with scale factors



1cm : 250m

Ratios need to be in the same units

1cm : 250m

1cm : 25000cm

$250 \times 100 = 25000$

For every 1cm on my map is 25000cm in real life.

