

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

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

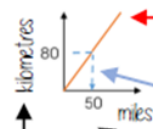
This is a multiplicative change
 4 cans of pop = £2.40
 $\times 3$
 12 cans of pop = £7.20

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



Labelling of both axes is vital

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

Conversion between currencies



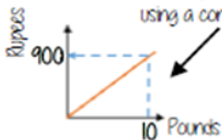
£1 = 90 Rupees

Currency is directly proportional

For every £1 I have 90 Rupees

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

Currency can be converted using a conversion graph



Convert 630 Rupees into Pounds

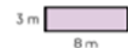
£1 - 90 Rupees
 $\times 7$
 £7 - 630 Rupees

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.



Corresponding sides

3m : 45m
 $\times 15$
 8m : 120m

45m : 7m
 $\times 15$
 1m : 15m

Note: Simplify to the same ratio

Understand Scale Factor

The two rectangles are similar.



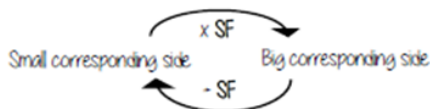
3 x 15 = 45
 This is a multiplicative change

Use corresponding sides to calculate a scale factor

Missing length
 $8 \times 15 = 12m$

Scale factor can also be calculated by

Bigger corresponding side
 Smaller 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
 $\times 10$
 10cm : 300cm

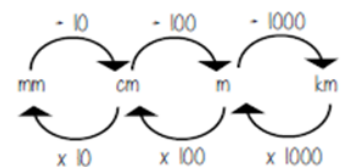


The car in real life is 210cm

Image : Real life
 1cm : 30cm
 $\times 7$
 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.



What do I need to be able to do?

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

- Carry out any multiplication or division using fractions and integers.
- Solutions can be modelled, described and reasoned

Keywords

Numerator: the number above the line on a fraction. The top number. Represents how many parts are taken.

Denominator: the number below the line on a fraction. The number represent the total number of parts.

Whole: a positive number including zero without any decimal or fractional parts.

Commutative: an operation is commutative if changing the order does not change the result.

Unit Fraction: a fraction where the numerator is one and denominator a positive integer.

Non-unit Fraction: a fraction where the numerator is larger than one.

Dividend: the amount you want to divide up.

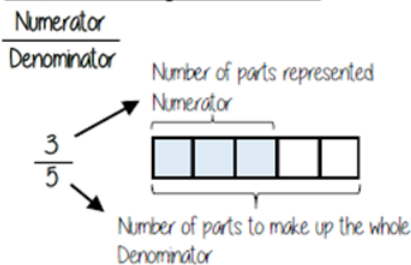
Divisor: the number that divides another number.

Quotient: the answer after we divide one number by another. e.g. dividend ÷ divisor = quotient

Reciprocal: a pair of numbers that multiply together to give 1.

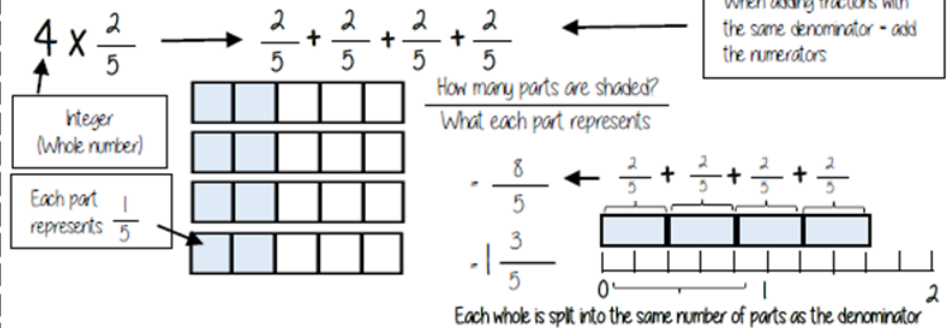


Representing a fraction



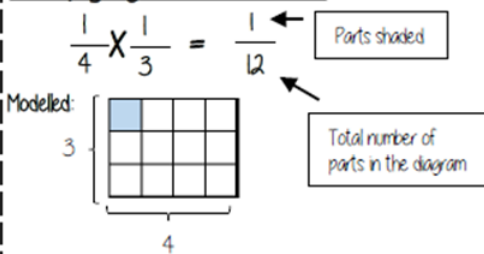
ALL PARTS of a fraction are of equal size

Repeated addition = multiplication by an integer

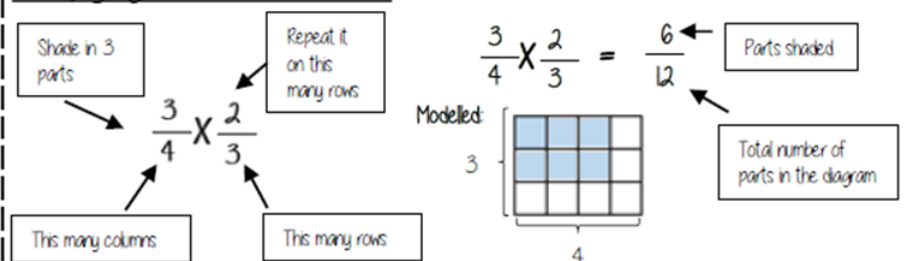


Revisit
When adding fractions with the same denominator - add the numerators

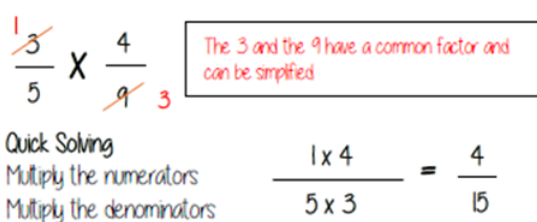
Multiplying unit fractions



Multiplying non-unit fractions

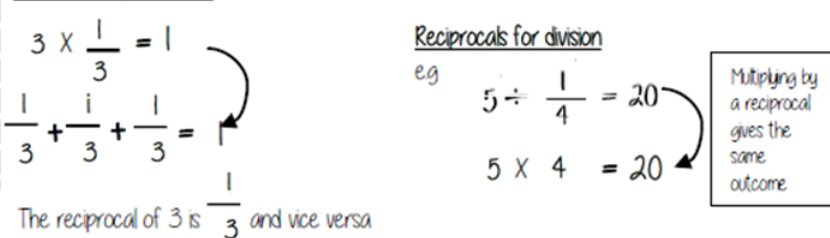


Quick Multiplying and Cancelling down

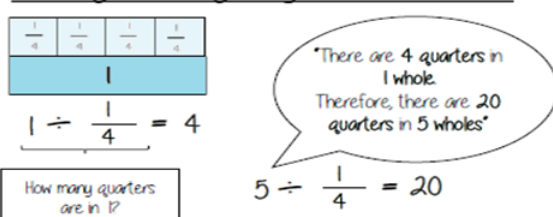


The reciprocal

When you multiply a number by its reciprocal the answer is always 1



Dividing an integer by an unit fraction



Dividing any fractions

Remember to use reciprocals

