YEAR 10 — PROPORTION...

Ratios and fractions

What do I need to be able to do?

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

- Compare quantities using ratio
- Link ratios and fractions and make comparisons
- Share in a given ratio
- Link Ratio and scales and graphs
- Solve problems with currency conversions
- Solve 'best buy' problems
- Combine ratios

Keywords

Ratio: a statement of how two numbers compare

Equivalent: of equal value

Proportion: a statement that links two ratios

Integer: whole number, can be positive, negative or zero.

Fraction: represents how many parts of a whole.

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

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

Origin: (0,0) on a graph. The point the two axes cross

Gradient: The steepness of a line

Compare with ratio (R)

"For every dog there are 2 cats"

Dogs: Cats

$1:2$

The ratio has to be written in the same order as the information is given.

e.g. 2:1 would represent 2 dogs for every 1 cat.

Units have the be of the same value to compare ratios

Ratios and fraction (R)

Trees: Flowers

$3:7$

Ratio

Flowers

Fraction

Fraction of trees

$$\frac{\text{Number of parts of in group}}{\text{Total number of parts}} = \frac{3}{10}$$
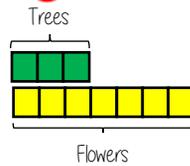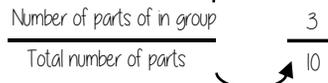
Sharing a whole into a given ratio (R)

James and Lucy share £350 in the ratio 3:4.
Work out how much each person earns

Model the Question

James: Lucy

$3:4$
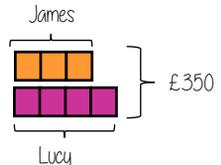
James £350 Lucy

Find the value of one part

Whole: £350

7 parts to share between (3 James, 4 Lucy)

£350 ÷ 7 = £50

☐ = one part = £50

Put back into the question

James: Lucy

$\times 50 \quad 3:4 \quad \times 50$

£150:£200

James = 3 x £50 = £150

£350
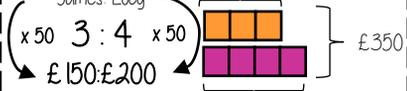
Lucy = 4 x £50 = £200
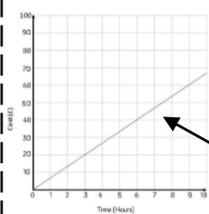
Ratio and graphs (R)

Graphs with a constant ratio are directly proportional
- Form a straight line
- Pass through (0,0)

The gradient is the constant ratio

Ratio and scale (R)

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

The car image is 10cm

Image : Real life

$\times 10$ \quad 1cm : 30cm \quad $\times 10$

10cm : 300cm

Conversion between currencies (R)

For every £1 I have 90 Rupees

£1 = 90 Rupees ← Currency is directly proportional

$\times 10$ \quad £1 = 90 Rupees \quad $\times 10$

£10 = 900 Rupees

Currency can be converted using a conversion graph

Rupees 900 / 10 Pounds
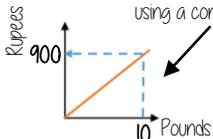
Convert 630 Rupees into Pounds

$\times 7$ \quad £1 = 90 Rupees \quad $\times 7$ ← 630 ÷ 90 = 7

£7 = 630 Rupees
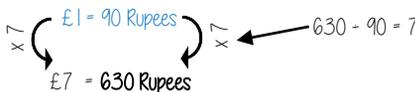
Ratios in 1:n and n:1

This is asking you to cancel down until the part indicated represents 1.

Show the ratio 4:20 in the ratio of 1:n

The question states that **this part has to be 1 unit** Therefore **Divide by 4**

$4:20$

$1:5$
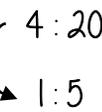
This side has to be divided by 4 too – to keep in **proportion**

the n part does not have to be an integer for this type of question

Combining ratios

B \quad R \quad G

The ratio of Blue counters to Red counters is 5:3
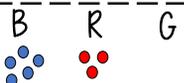
The ratio of Red counters to Green counters is 2:1
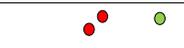
Ratio of Blue to Red to Green

$10:6:3$

Lowest common multiple of the ratio both statements share

Use equivalent ratios to allow comparison of the group that is common to both statements

Best buys

4 pens costs £2.60

10 pens costs £6.00

*You could work out how much 40 pens are and then compare*

Compare the solution in the context of the question

The best value has the lowest cost "per pen"

The best value means £1 buys you more pens

✏ "1 pen costs..."

£2.60 ÷ 4 = **£0.65**

£6.00 ÷ 10 = **£0.60**

£ "1-pound buys..."

4 ÷ 2.60 = **1.54 pens**

10 ÷ 6 = **1.67 pens**