

# YEAR 10 — PROPORTION...

# Ratios and fractions

@whisto\_maths

## What do I need to be able to do?

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

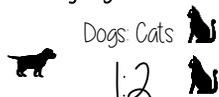
- Compare quantities using ratio
- Link ratios and fractions and make comparisons
- Share in a given ratio
- Link Ratio and scales and graphs
- Solve problems with currency conversions
- Solve 'best buy' problems
- Combine ratios

## 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'



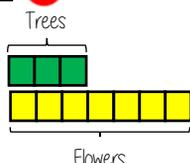
The ratio has to be written in the same order as the information is given.  
eg. 2:1 would represent 2 dogs for every 1 cat.

Units have to be of the same value to compare ratios

## Ratios and fraction R

Trees: Flowers

3:7



Fraction of trees

Number of parts of in group: 3  
Total number of parts: 10

Ratio

Fraction

## Sharing a whole into a given R

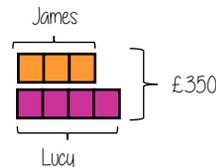
ratio

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

Model the Question

James: Lucy

3:4



Find the value of one part

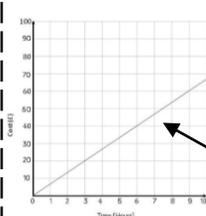
Whole: £350  
7 parts to share between (3 James, 4 Lucy)

£350 ÷ 7 = £50  
□ = one part = £50

Put back into the question

James = 3 × £50 = £150  
Lucy = 4 × £50 = £200  
Total: £150 + £200 = £350

## 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



## Conversion between currencies R

£1 = 90 Rupees



Currency is directly proportional

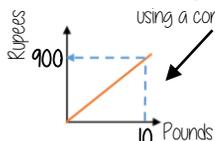
For every £1 I have 90 Rupees

£1 = 90 Rupees  
£10 = 900 Rupees

Currency can be converted using a conversion graph

Convert 630 Rupees into Pounds

£1 = 90 Rupees  
£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

## Best buys



4 pens costs £2.60



10 pens costs £6.00

1 pen costs... £2.60 ÷ 4 = £0.65

10 pens ÷ 10 = £0.60

1-pound buys... 4 ÷ 2.60 = 154 pens

10 ÷ 6 = 167 pens

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

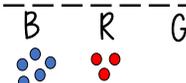
Compare the solution in the context of the question

The best value has the lowest cost 'per pen'

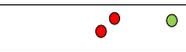
The best value means £1 buys you more pens

## Combining ratios

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

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

Lowest common multiple of the ratio both statements share