

# YEAR 8 — PROPORTIONAL REASONING... Ratio and Scale

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

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

- Simplify any given ratio
- Share an amount in a given ratio
- Solve ratio problems given a part

Solutions should be modelled, explained and solved

## Keywords

**Ratio:** a statement of how two numbers compare

**Equal Parts:** all parts in the same proportion, or a whole shared equally

**Proportion:** a statement that links two ratios

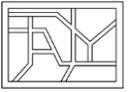
**Order:** to place a number in a determined sequence

**Part:** a section of a whole

**Equivalent:** of equal value

**Factors:** integers that multiply together to get the original value

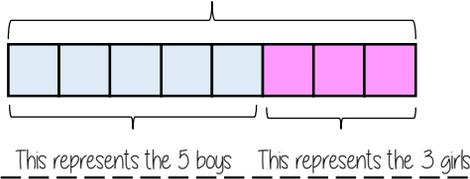
**Scale:** the comparison of something drawn to its actual size



## Representing a ratio

"For every 5 boys there are 3 girls"

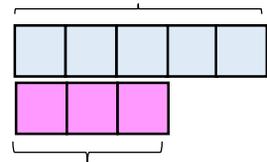
This is the "whole" — boys and girls together



5:3

This represents the 5 boys

Double Number Line



This is the "whole" — boys and girls together

## Order is Important

"For every dog there are 2 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 ✗

## Simplifying a ratio

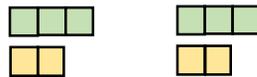
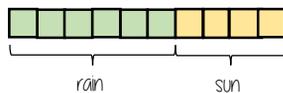
Cancel down the ratio to its lowest form

"For every 6 days of rain there are 4 days of sun"

6:4

÷ by 2 ↓

3:2



Find the biggest common factor that goes into all parts of the ratio

For 6 and 4 the biggest factor (number that multiplies into them is 2)

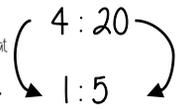
"For every 3 days of rain there are 2 days of sun" — when this happens twice the ratio becomes 6:4

## Ratio 1:n (or 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



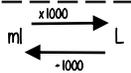
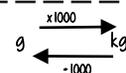
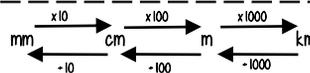
This side has to be divided by 4 too — to keep in proportion

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

## Units are important:

When using a ratio — all parts should be in the same units

Useful Conversions



## Sharing a whole into a given 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



Lucy

£350 ÷ 7 = £50

□ = one part = £50

Find the value of one part

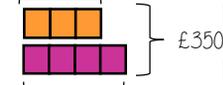
Whole: £350  
7 parts to share between  
(3 James, 4 Lucy)

Put back into the question

James: Lucy

James = 3 x £50 = £150

(x 50) 3:4 (x 50)  
→ £150:£200



Lucy = 4 x £50 = £200

## Finding a value given 1:n (or n:1)

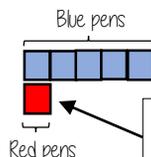
Inside a box are blue and red pens in the ratio 5:1  
If there are 10 red pens how many blue pens are there?

Model the Question

Blue: Red

5:1

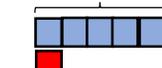
□ = one part = 10 pens



Put back into the question

Blue pens = 5 x 10 = 50 pens

Blue: Red  
(x 10) 5:1 (x 10)  
→ 50:10



Red pens = 1 x 10 = 10 pens

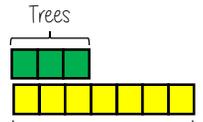
There are 50 Blue Pens

## Ratio as a fraction



Trees: Flowers

3:7

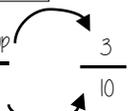


Ratio

There are 3 parts for trees

Fraction of trees

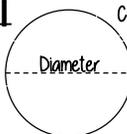
Number of parts in group  
Total number of parts



Fraction

Trees parts 3 + Flower parts 7 = 10

π



Circumference

Diameter

The ratio of a circle's circumference to its diameter