



### 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

This represents the 5 boys

This represents the 3 girls

This is the "whole" - boys and girls together

5:3

#### 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

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)

+ by 2

3:2

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

#### Order is Important

"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. ✗

#### 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

4:20

1:5

\*H\* 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

£350

Find the value of one part

Whole: £350

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

Put back into the question

James: Lucy

3:4

James = 3 x £50 = £150

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 unit = 10 pens

Put back into the question

Blue: Red

5:1

Blue pens = 5 x 10 = 50 pens

Red pens = 1 x 10 = 10 pens

There are 50 Blue Pens

#### 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

10cm: 300cm

The car in real life is 210cm

Image: Real life

1cm: 30cm

7cm: 210cm

#### Ratio as a fraction

Trees: Flowers

3:7

There are 3 parts for trees

Number of parts of in group

Total number of parts

3

10

Tree parts 3 + Flower parts 7 = 10

#### Pi

The ratio of a circles circumference to its diameter

#### Interpret maps with scale factors

1 cm : 250m

Ratios need to be in the same units

1 cm : 25000cm

250 x 100 = 25000

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

#### Understand Scale Factor

The two rectangles are similar.

3 x 15 = 4.5

8 x 15 = 12m

Use corresponding sides to calculate a scale factor

Scale factor can also be calculated by:

Bigger corresponding side

Smaller corresponding side

x SF

- SF

# Knowledge Organiser: Mathematics

## Year 8 Autumn 1

Suggested websites: Maths Genie, Save My Exams and Corbett Maths



### 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

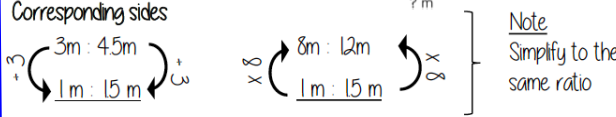
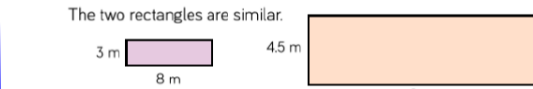
### Keywords

**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.

### Ratio between similar shapes

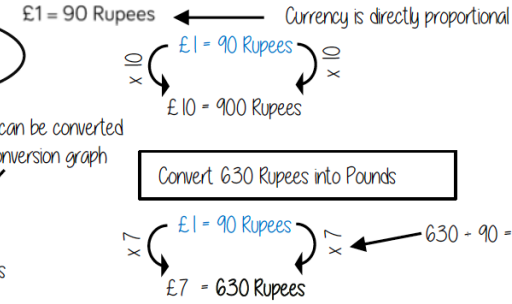
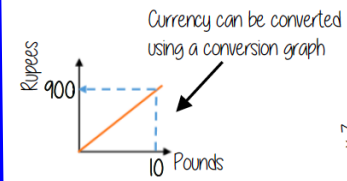


Angles in similar shapes do not change.  
 e.g. if a triangle gets bigger the angles can not go above 180°



### Conversion between currencies

For every £1 I have 90 Rupees



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

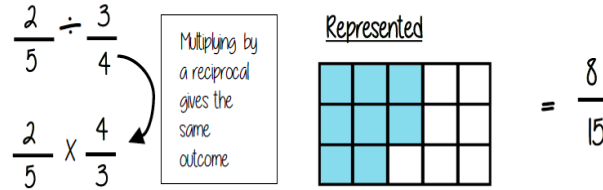
By the end of this unit you should be able to:

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

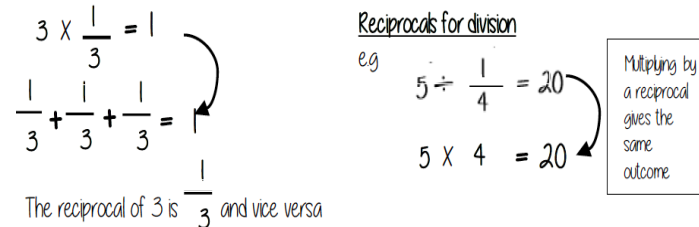
### Keywords

**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

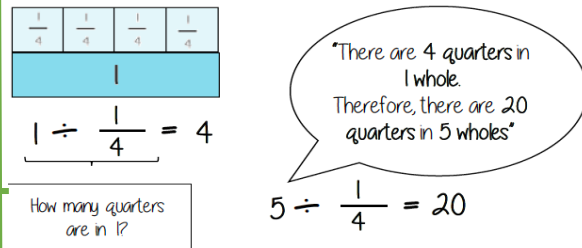
### Dividing any fractions Remember to use reciprocals



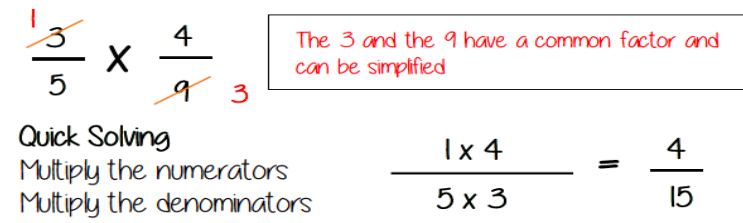
### The reciprocal When you multiply a number by its reciprocal the answer is always 1



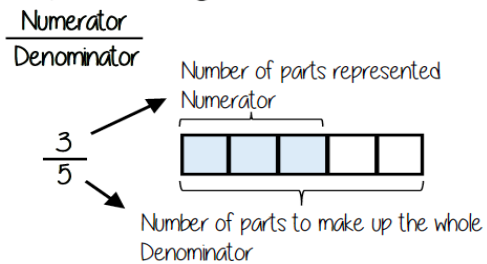
### Dividing an integer by a unit fraction



### Quick Multiplying and Cancelling down

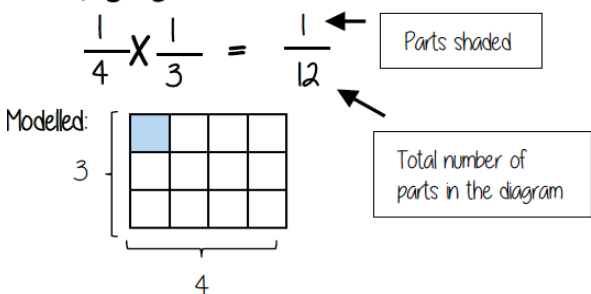


### Representing a fraction

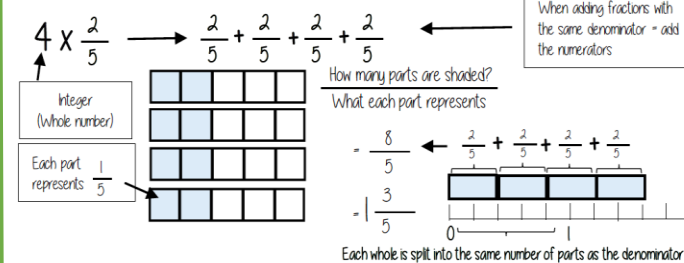


ALL PARTS of a fraction are of equal size

### Multiplying unit fractions



### Repeated addition = multiplication by an integer



### Multiplying non-unit fractions

