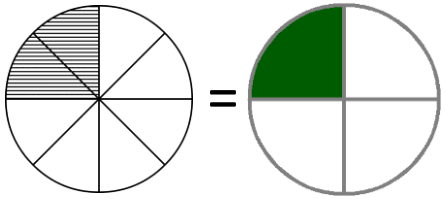
RATIO AND SCALE

Key Concept

2 parts → 2:6 ← 6 parts

=

1:3



$= \frac{1}{4}$

Key Words

Ratio: Relationship between two numbers.
Part: This is the numeric value '1' of, would be equivalent to.
Simplify: Divide both parts of a ratio by the same number.
Equivalent: Equal in value.
Convert: Change from one form to another.

Examples

Simplify 60 : 40 : 100

÷ 10

6 : 4 : 10

÷ 2

3 : 2 : 5

This could have been done in one step by dividing by 20.

Write 2: 5 in the form 1 : n

2 : 5

÷ 2 ÷ 2

1 : 2.5

Share £45 in the ratio 2 : 7

45 ÷ 9 = 5

£10 : £35

2 : 7

5	5
5	5
=10	5
	5
	5
	5
	5
	=35

Joy and Martin share money in the ratio 2 : 5. Martin gets £18 more than Joy. How much do they each get?

2 : 5

6	6
6	6
	6
	6
	6
	=12 =30

18 ÷ 3 = 6

£12 : £30

Tip

Its often useful to write the letters above the ratio. This helps you keep the order the correct way round.

Questions

1) Simplify a) 45 : 63 b) 66 : 44 c) 320 : 440
2) Write in the form 1 : n a) 5 : 10 b) 4: 6 c) $x : x^2 + x$
3) Share 64 in the ratio 3 : 5 4) Write the ratio 1 : 4 as a fraction.

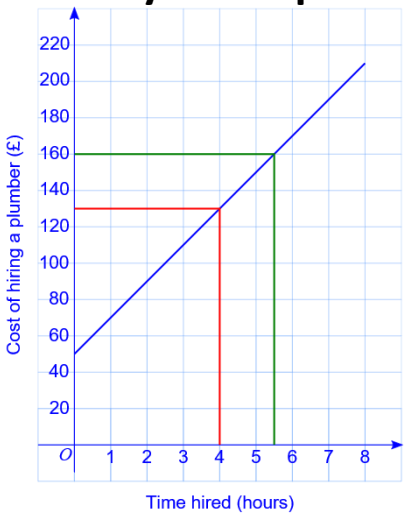
ANSWERS: 1) a) 5 : 7 b) 3 : 2 c) 8 : 11 2) a) 1 : 2 b) 1 : 1.5 c) $1 : x + 1$
3) 24 : 40 4) $1/5$

sparx

M981,U171, U680

MULTIPLICATIVE CHANGE

Key Concept

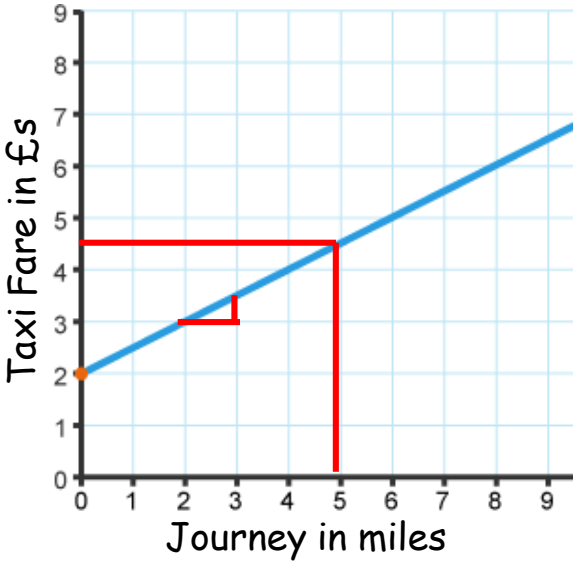


Gradient – The extra cost incurred for every extra hour.
y-intercept – The minimum payment to the plumber.

Key Words

Conversion graph: A graph which converts between two variables.
Intercept: Where two graphs cross.
y-intercept: Where a graph crosses the y-axis.
Gradient: The rate of change of one variable with respect to another. This can be seen by the steepness.
Simultaneous: At the same time.

Examples



What is the minimum taxi fair?
£2, this is the y-intercept.

What is the charge per mile?
50p, every extra mile adds on 50p.

How much would a journey of 5 miles cost?
£4.50, See line drawn up from 5 miles to the graph, then drawn across to find the cost.

sparx

M932, M658
M843, M771

Tip
The solution to two linear equations with two unknowns is the coordinates of the intercept (where they cross).

Questions
1) For the graph above a) A journey is 8 miles, what is its cost?
b) A journey cost just £3, how far was the journey?
2) Draw a graph to show the exchange rate £1 = $1.4.

ANSWERS: 1) a) £6 b) 2 miles

OPERATIONS WITH FRACTIONS

Key Concept

Mixed numbers

These are made up of a whole number and a fraction.

$$4\frac{3}{5}$$

$$= \frac{4 \times 5 + 3}{5}$$

$$= \frac{23}{5}$$

Key Words

Fraction: A fraction is made up of a numerator (top) and a denominator (bottom).

Add Sum Total All together Plus In all	Multiply Product Times Twice Total Multiplied by
Subtract Remain Difference Less than Fewer How many more Minus	Divide Quotient Goes into Split Equally Each

Examples

Addition $\frac{3}{5} + \frac{2}{7}$

Make the denominators the same

$\frac{3}{5} + \frac{2}{7}$ (×7, ×5)

$\frac{21}{35} + \frac{10}{35} = \frac{31}{35}$

Subtraction $\frac{3}{5} - \frac{2}{7}$

$\frac{3}{5} - \frac{2}{7}$ (×7, ×5)

$\frac{21}{35} - \frac{10}{35} = \frac{11}{35}$

4 Rules Fractions

Multiplication $\frac{3}{5} \times \frac{2}{7}$

Just multiply the tops and bottoms

$$= \frac{3 \times 2}{5 \times 7} = \frac{6}{35}$$

Division $\frac{3}{5} \div \frac{2}{7}$

Flip the second fraction and change to a times

$$\frac{3}{5} \times \frac{7}{2} = \frac{21}{10}$$

sparx

M671, M939, M601, M835, M931, M157, M197, M110

Tip

- A larger denominator **does not** mean a larger fraction.
- To find equivalent fractions multiply/divide the numerator and denominator by the same number.

Questions

1) $\frac{3}{5} + \frac{4}{15}$ 2) $\frac{2}{7} + \frac{5}{8}$ 3) $\frac{7}{9} - \frac{2}{5}$ 4) $\frac{3}{7} \times \frac{4}{9}$ 5) $\frac{3}{11} \div \frac{14}{22}$

ANSWERS: 1) $\frac{13}{15}$ 2) $\frac{51}{56}$ 3) $\frac{17}{45}$ 4) $\frac{4}{21}$ 5) $\frac{3}{7}$

NUMBER SENSE

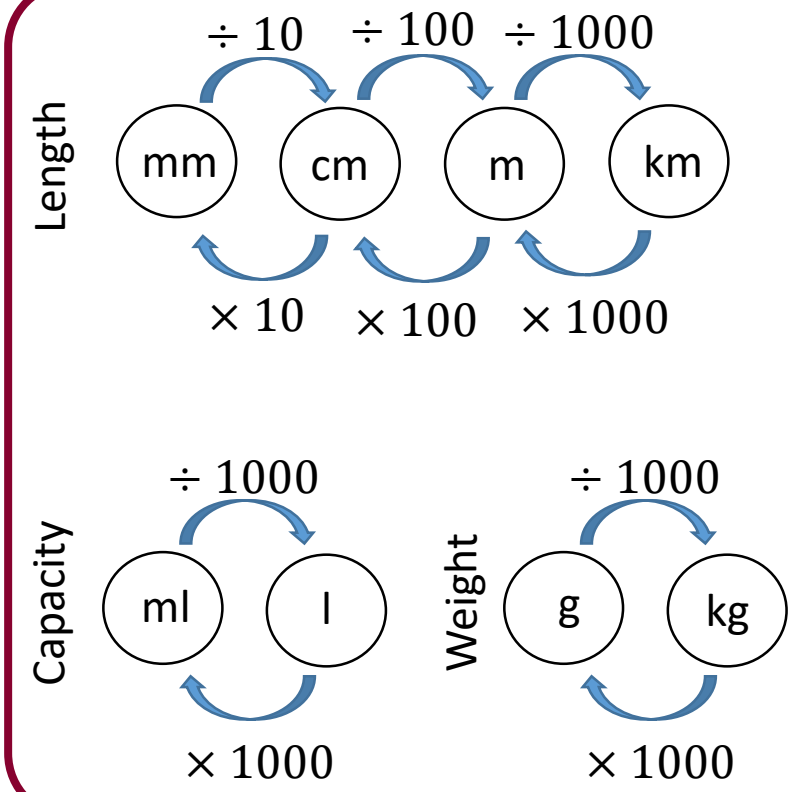
Key Concept

Metric units of **length**:
mm, cm, m, km

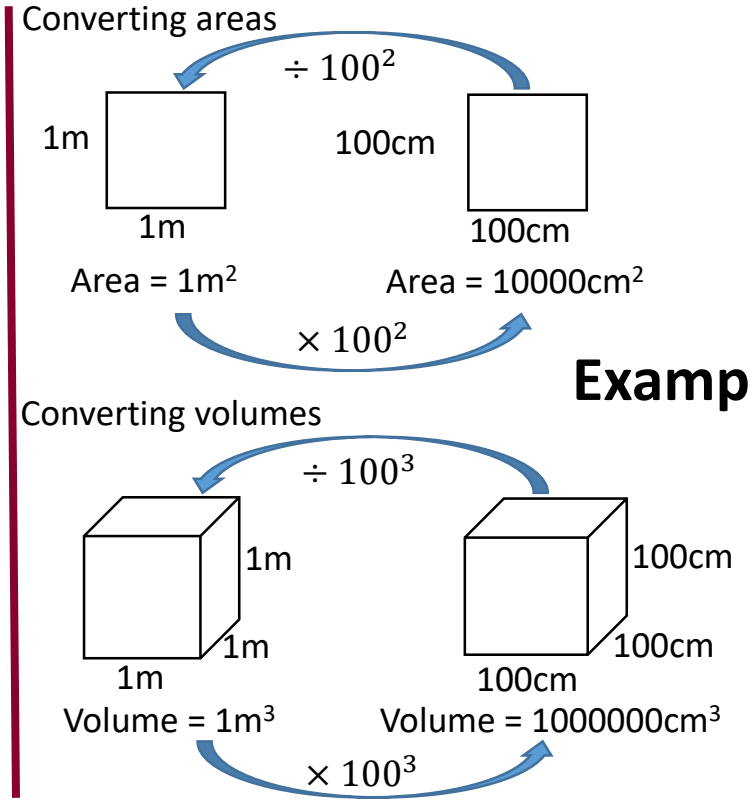
Metric units of **weight**:
g, kg

Metric units of **capacity**:
ml, l

All of these units are **metric** units. They will always use conversions of multiples of 10, eg.10, 100, 1000 etc.



Examples



sparx

M487

Key Words

Length
Weight
Capacity
Metric

Convert each of the following:

a) 12cm into mm
b) 1783g into kg
c) 2.5 litres into ml
d) 6.8m into mm
e) 5000000cm³ into m³
f) 2m² into cm²

ANSWERS: a) 120mm b) 1.783kg c) 2500ml d) 6800mm e) 5m³ f) 20000cm²