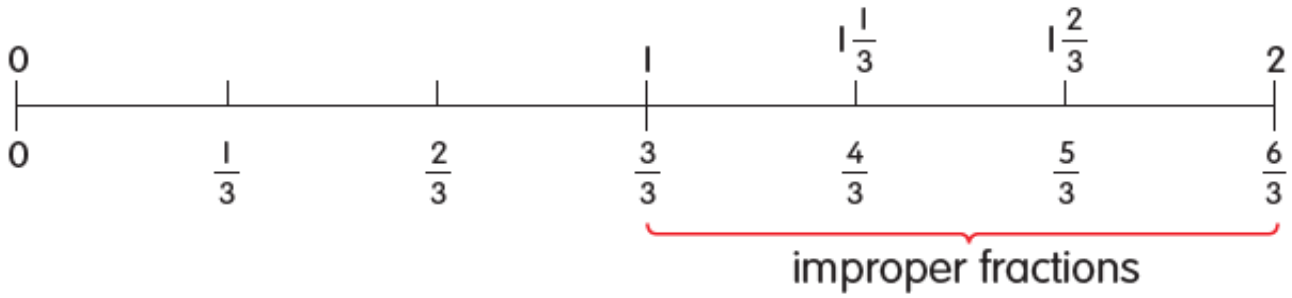
MATHS SRING 2 KNOWLEDGE ORGANISERS

Year 5 Unit 4—Fractions

Equivalence	Having the same value $\frac{1}{2}$ $\frac{2}{4}$ $\frac{8}{16}$ 1÷2 =0.5 2÷4 =0.5 8÷16 =0.5
Proper Fraction	A fraction smaller than one whole $\frac{2}{3}$ $\frac{3}{10}$

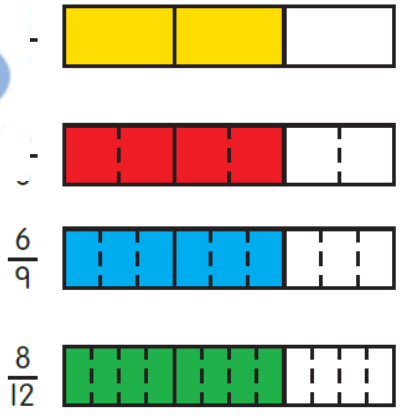
Improper Fraction	A fraction greater than one whole $\frac{8}{5}$
Mixed Number	Written as a whole number and a proper fraction $1\frac{3}{4}$ $\frac{7}{4}$

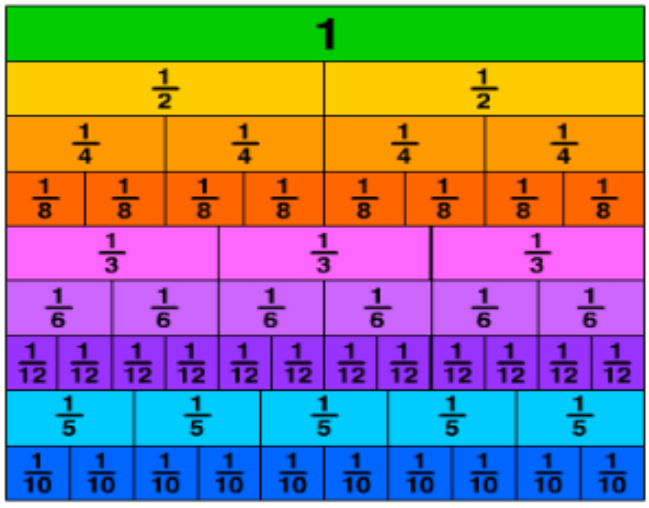


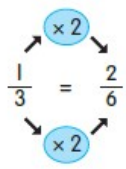
$\frac{3}{3}$, $\frac{4}{3}$, $\frac{5}{3}$ and $\frac{6}{3}$ are equal to or greater than 1.
They are called **improper fractions**.

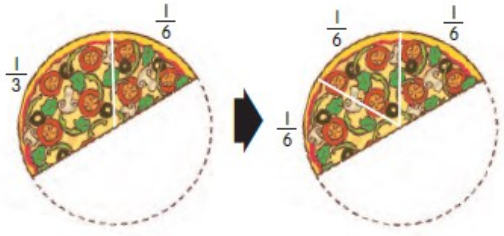
Equivalent Fractions

$\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12}$





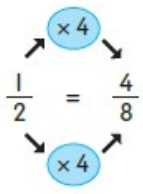


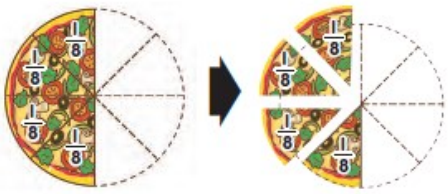


Then add.

$\frac{1}{3} + \frac{1}{6} = \frac{2}{6} + \frac{1}{6}$

$= \frac{3}{6}$





Then subtract.

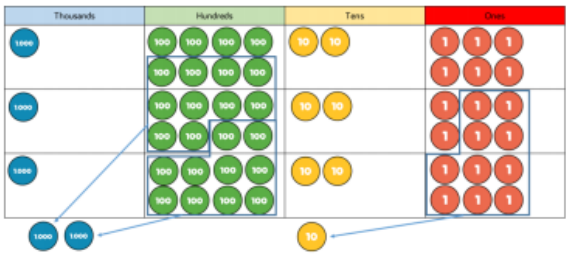
$\frac{1}{2} - \frac{3}{8} = \frac{4}{8} - \frac{3}{8}$

$= \frac{1}{8}$

Year 5 Unit 5 —Multiplication and Division

Multiplication

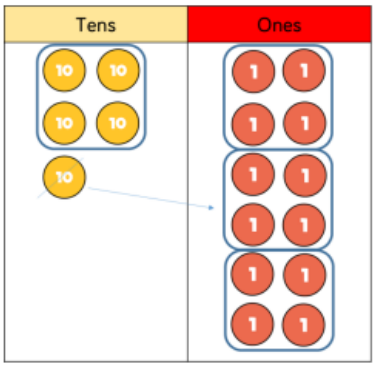
$$\begin{array}{r} 34 \\ \times\ 5 \\ \hline 170 \\ \hline 1\ 2 \end{array}$$



$1{,}826 \times 3 = 5{,}478$

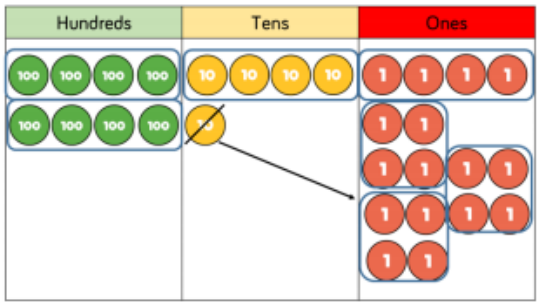
	Th	H	T	O
	1	8	2	6
×				3
	5	4	7	8
	2		1	

Division —written methods

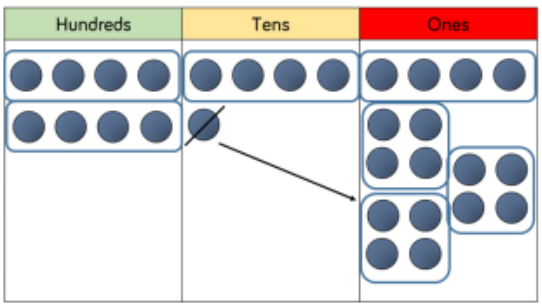


$52 \div 4 = 13$

		1	3	
	4	5	$^{1}2$	



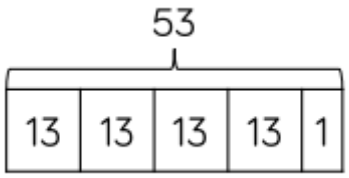
		2	1	4
	4	8	5	$^{1}6$



$856 \div 4 = 214$

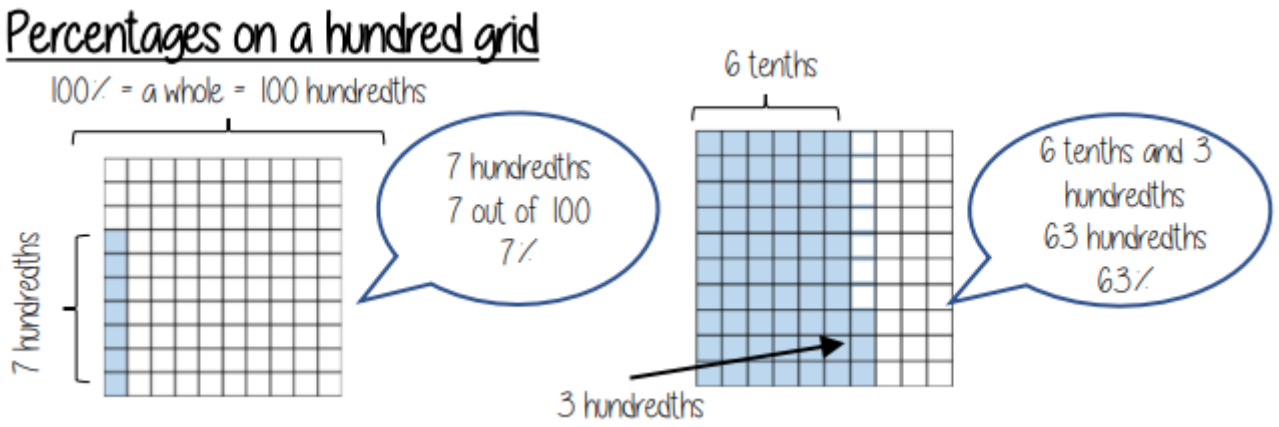
Remainder— The amount left over after a division

$53 \div 4 = 13\ r1$

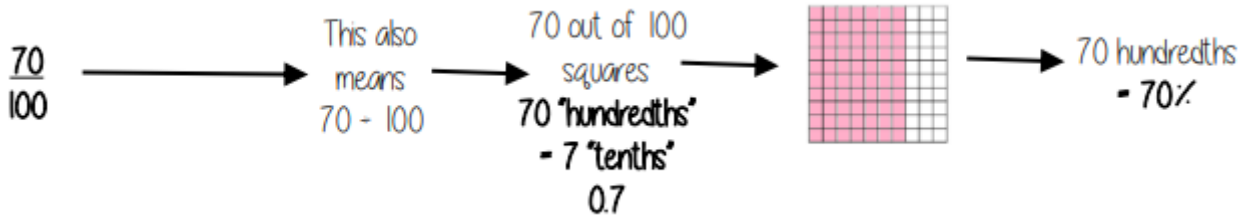


Year 6 Unit 7
Percentages

Percentage means out of 100

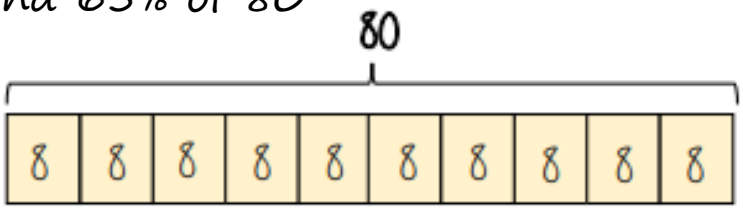


Equivalence



Find the percentage of an amount using mental methods.

Find 65% of 80



For bigger percentages it is sometimes easier to take away from 100%

Method 1

65%=(10% x6) + 5%

=(8x6) +4

= 54

Method 2

65% =50% + 10% + 5%

=40 + 10 + 4

=54

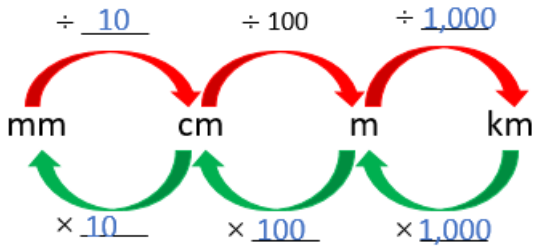
Year 6 Unit 8
Metric Conversions

Metric Units

Length	The measurement of something from end to end
Capacity	The maximum amount that something can contain
Mass	The amount of matter that makes up an object or substance

Length	Capacity	Mass
cm km mm m	ml l	g tonne kg

Length

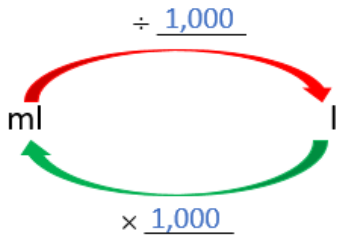


There are 10 millimetres in 1 centimetre.

There are 100 centimetres in 1 metre.

There are 1,000 metres in 1 kilometre.

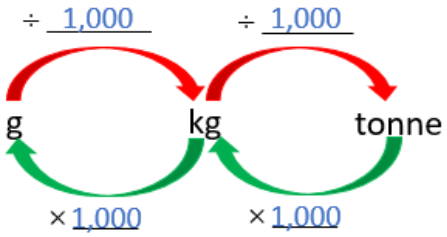
Capacity



There are 1,000 millilitres in 1 litre.

One thousandth
One thousandth of a litre

Mass



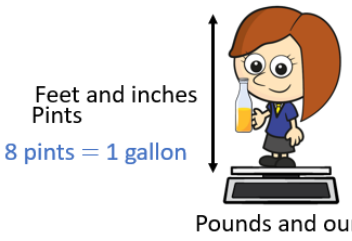
There are 1,000 grams in 1 kilogram.

There are 1,000 kilograms in 1 tonne.

Imperial Measures

16 ounces = 1 pound

14 pounds = 1 stone



12 inches = 1 foot

1 inch ≈ 2.5 cm

5 miles ≈ 8 km

× 8 ×8

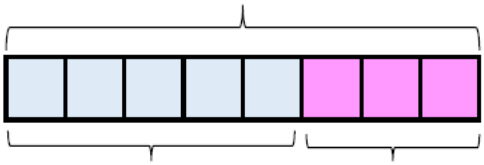
40 miles ≈ 64 km

Year 6 Unit 9—Ratio

What is a ratio?

For every 5 Blues there are 3 pinks

This is the 'whole' - blues and pinks together

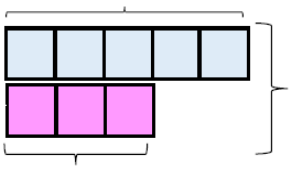


This represents the 5 blues

This represents the 3 pinks

5:3

This represents the 5 blues



This is the 'whole' - blues and pinks together

This represents the 3 pinks

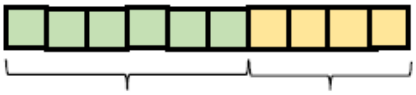
Simplifying a ratio

Cancel down the ratio to its lowest form

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

6:4

÷ by 2



rain sun

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

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

@whisto_maths

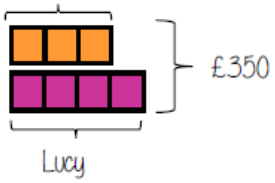
Dividing into a given ratio

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

Model the Question

James: Lucy

3 : 4



Find the value of one part

Whole: £350

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

£350 ÷ 7 = £50

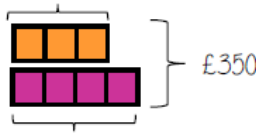
□ = one part = £50

Put back into the question

James: Lucy

x 50 3 : 4 x 50

£150:£200



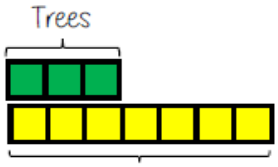
James = 3 x £50 = £150

Lucy = 4 x £50 = £200

Ratio and fractions

Trees: Flowers

3 : 7



Ratio

There are 3 parts for trees

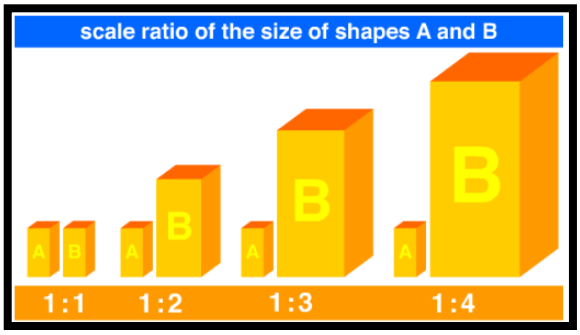
Fraction of trees

Fraction

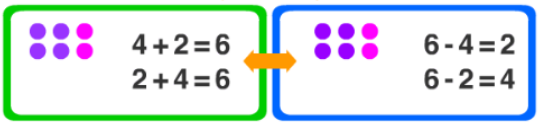
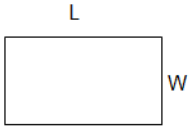
Number of parts of in group / Total number of parts

3/10

Tree parts 3 + Flower parts 7 = 10



Year 7 Unit 6
Applying Addition and Subtraction

Addition	The joining of two or more numbers or quantities.	In addition two or more numbers are joined to get one number which is the sum or the total .
Sum Total	The result of adding; the whole amount	
Subtraction	When one quantity is taken away from another	80 subtract 30 is 50. The difference between 80 and 30 is 50
Difference	The result of subtracting one number from another	
Commutative	Numbers can be added in any order, but in subtraction the order is important.	$a + b = b + a$ $6 + 2 = 8$ or $2 + 6 = 8$
Associative	In addition, no matter how numbers are grouped, the answers will be same.	 (6 + 3) + 4 = 6 + (3 + 4)
Inverse	The reverse or opposite of an operation.	 4+2=6 2+4=6 6-4=2 6-2=4
Perimeter	The distance around a polygon.	 L W Perimeter = 2L + 2W Same as: L + L + W +W
Profit	Profit occurs when an item is sold for more than it cost to purchase.	 Bakery Income Expenses Profit
Loss	Loss occurs when an item is sold for less than it cost to purchase.	

Addition and Subtraction

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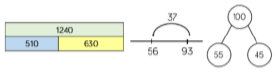


Modelling methods for addition/ subtraction
- Bar models
- Number lines
- Part/ Whole diagrams

Addition is commutative

6 + 3 = 3 + 6

The order of addition does not change the result

Subtraction the order has to stay the same

$360 - 147 = 360 - 100 - 40 - 7$

- Number lines help for addition and subtraction
- Working in 10's first aids mental addition/ subtraction
- Show your relationships by writing fact families

Formal written methods

	H	T	O
	1	8	7
+	5	4	2

	H	T	O
	4	2	7
−	2	4	9

Remember the place value of each column. You may need to move 10 ones to the ones column to be able to subtract

Addition and Subtraction of decimals

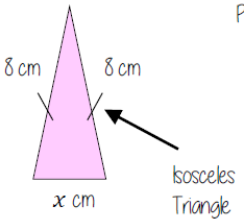
4	.	3	8	
7	.	9	0	+

0 can be used to fill empty places with value

The decimal place acts as the placeholder and aligns the other values

Perimeter problems

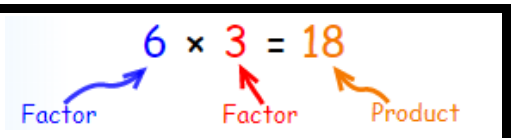
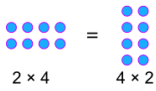
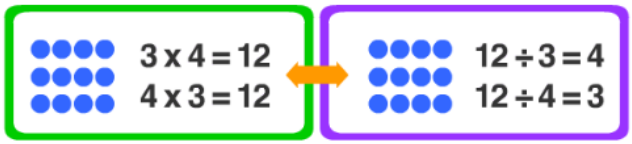
Perimeter is the length around the outside of a polygon



The triangle has a perimeter of 25cm
Find the length of x

$8cm + 8cm + xcm = 25cm$
$16cm + xcm = 25cm$
$xcm = 9cm$

Year 7 Unit 7
Applying Multiplication and Division

Product	The result when two numbers are multiplied.	
Factor	Numbers we can multiply together to get another number.	
Multiple	The result of multiplying a number by a positive whole number	6, 12, 18, 20, 24 ….. are all multiples of 6
Commutative	Numbers can be multiplied in any order, but in division the order is important.	
Inverse	The reverse or opposite of an operation. 	

Multiplication methods

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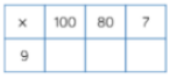
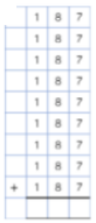
Long multiplication (column)



Grid method



Repeated addition

Less effective method especially for bigger multiplication

Multiplication with decimals

Perform multiplications as integers
e.g. 0.2 x 0.3 → 2 x 3

Make **adjustments** to your answer to match the question: 0.2 x 10 = 2
0.3 x 10 = 3
Therefore 6 ÷ 100 = 0.6

Estimations: Using estimations allows a 'check' if your answer is reasonable

Division methods

3584 ÷ 7 = 512

Short division

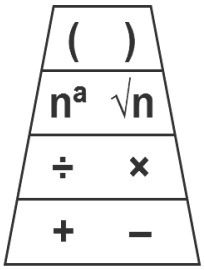
$$\begin{array}{r} 5\ 1\ 2 \\ 7 \overline{)\ 3\ {}^{3}5\ 8\ {}^{1}4} \end{array}$$

Complex division

÷ 24 = ÷ 6 ÷ 4

Break up the divisor using factors

Order of Operations



Brackets

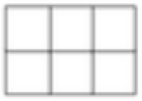
Powers /Indices

Multiplication or Division

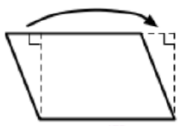
Addition or Subtraction

Area

Rectangle
Base x Perpendicular height



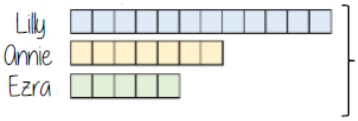
Parallelogram/ Rhombus
Base x Perpendicular height



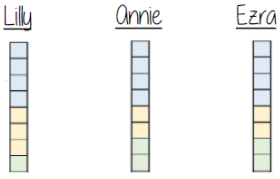
Triangle
½ x Base x Perpendicular height

A triangle is half the size of the rectangle it would fit in

Mean problems



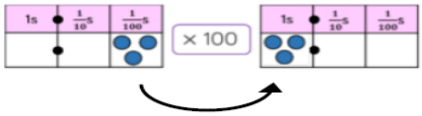
Finding the mean amount is the average amount each person would have if shared out equally



The mean number of blocks would be 8 each

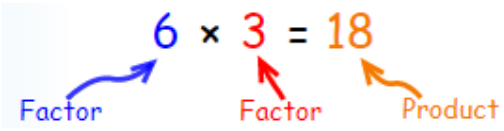
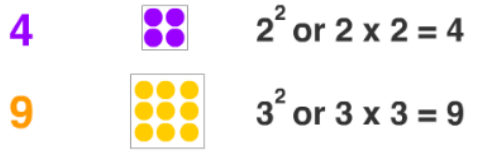
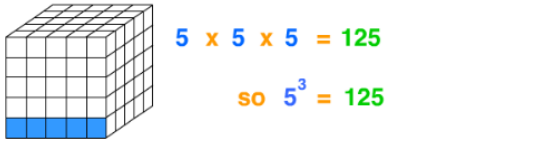
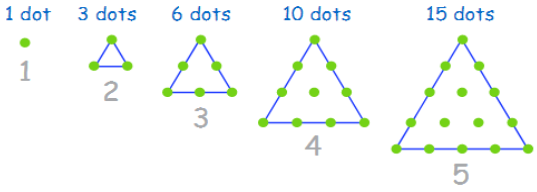
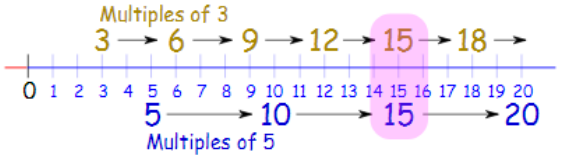
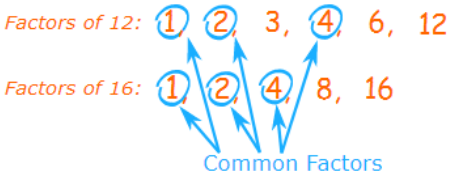
Multiply by powers of 10

3 x 100 = 300



0.03 x 100 = 3

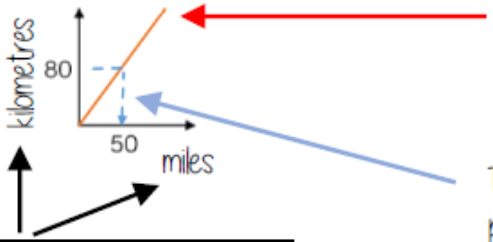
Year 8 Unit 6
Prime Numbers and Proof

Product	The result when two numbers are multiplied.	
Factor	Numbers we can multiply together to get another number.	
Multiple	The result of multiplying a number by a positive whole number	6, 12, 18, 20, 24 ….. are all multiples of 6
Square Number	To square a number: just multiply it by itself. 4 squared is 4 × 4 = 16. Often shown with a little 2 in the corner like this: $4^2 = 16$ that is said "4 squared equals 16"	
Cube Number	The result of using a whole number in a multiplication three times.	
Triangular Number	A number that can make a triangular dot pattern. 1, 3, 6, 10, 15	
Lowest Common Multiple	The smallest number that is the multiple of two or more other numbers.	 15 is the lowest common multiple (LCM) of 3 and 5
Highest Common Factor	The highest number that is a factor of two or more numbers.	 4 is the highest common factor (HCF) of 12 and 16
Prime Numbers	A whole number greater than 1 that can not be made by multiplying other whole numbers. They only have 2 factors; one and themselves	**prime numbers to 100** 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Year 8 Unit 8 Multiplicative Change

Proportion	A statement that links two ratios
Variable	A part where the value can be changed
Scale Factor	The multiple that increases or decreases a shape in size
Conversion	The process of changing one variable to another

Conversion Graphs



Labelling of both axes is vital

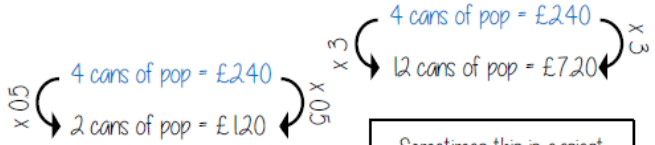
This is always a straight line because as one variable increases so does the other at the same rate

To make conversions between units you need to find the point to compare – then find the associated point by using your graph
Using a ruler helps for accuracy
Showing your conversion lines help as a "check" for solutions

Direct Proportion

As one variable changes the other changes at the same rate

4 cans of pop = £2.40



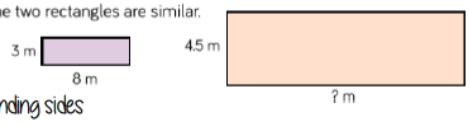
This multiplier is the same In the same way that this would be for ratio

Sometimes this is easiest if you work out how much one unit is worth first
e.g. 1 can of pop = £0.60

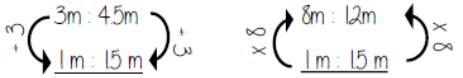
Ratio in similar shapes

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

The two rectangles are similar.



Corresponding sides



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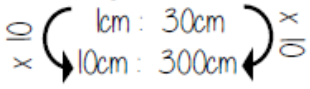
Interpreting Scale Drawings

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

For every 1cm on my image is 30cm in real life

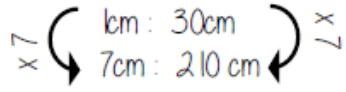
The car image is 10cm

Image : Real life

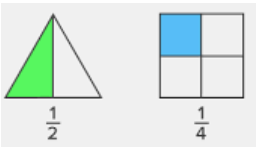
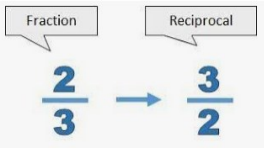


The car in real life is 210cm

Image : Real life



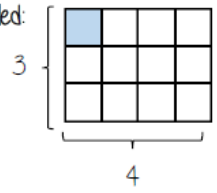
Year 8 Unit 9
Multiplying and Dividing Fractions

Unit Fractions	Fractions with a numerator of one,	
Reciprocal	A pair of numbers that multiply together to give 1	

Multiplying Unit Fractions

$\frac{1}{4} \times \frac{1}{3} = \frac{1}{12}$ ← Parts shaded

Modelled:



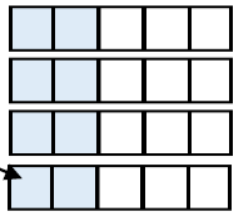
Total number of parts in the diagram

Multiplying by an integer=repeated addition

$4 \times \frac{2}{5} \rightarrow \frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5}$

Integer (Whole number)

Each part represents $\frac{1}{5}$



How many parts are shaded?
What each part represents

$= \frac{8}{5}$

$= 1\frac{3}{5}$

Multiplying non-unit fractions

Shade in 3 parts

Repeat it on this many rows

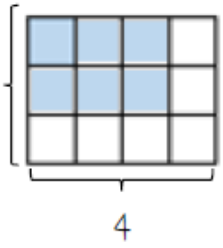
$\frac{3}{4} \times \frac{2}{3}$

This many columns

This many rows

$\frac{3}{4} \times \frac{2}{3} = \frac{6}{12}$ ← Parts shaded

Modelled:



Total number of parts in the diagram

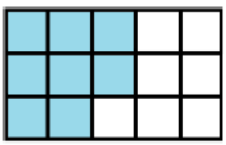
Dividing by any fraction

$\frac{2}{5} \div \frac{3}{4}$

$\frac{2}{5} \times \frac{4}{3}$

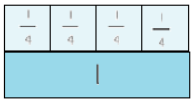
Multiplying by a reciprocal gives the same outcome

Represented



$= \frac{8}{15}$

Dividing an integer by a unit fraction



$1 \div \frac{1}{4} = 4$

How many quarters are in 1?

"There are 4 quarters in 1 whole. Therefore, there are 20 quarters in 5 wholes"

$5 \div \frac{1}{4} = 20$

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