

1) **Column method** can be used to add or subtract large numbers.

Remember to line up the units, tens, hundreds etc.

It can be useful to estimate an answer to a question before working it out exactly. To do this, round your numbers to the nearest whole number, ten, hundred or thousand, depending on how large your numbers are.

Use BIDMAS for multistep calculations-

**B**rackets

**I**ndices

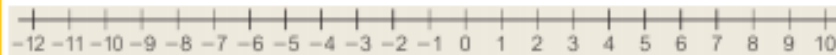
**D**ivision and **M**ultiplication

**A**ddition and **S**ubtraction

Indices mean powers like  $\cdot$  and  $\sqrt{\quad}$

75

2) A **number line** can help you with negative numbers.



+ - is the same as -

- - is the same as +

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3) A **ratio** says how much of one thing there is compared to another.

We use a colon symbol,  $:$  to separate the numbers in a ratio.

You can **simplify** a ratio by dividing the numbers in the ratio by the same number.

Multiplying all the numbers in a ratio by the same number gives an **equivalent ratio**.

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A sketch can sometimes help you solve a ratio problem. You could use a bar model.

4)



Cube



Cuboid



Triangular prism



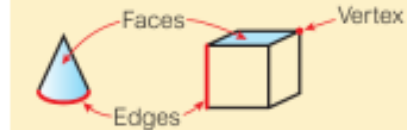
Cylinder

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Square based pyramid

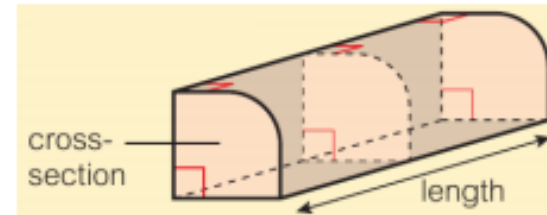
A 3D solid has **faces**, **edges** and **vertices**. Faces and edges can be flat or curved.



5) A **prism** is a solid shape that has the same cross-section throughout its length.

The **cross-section** can be any flat shape. It is perpendicular to the length of the solid.

MathsWatch clip 43



6) The **volume** of a shape is the amount of 3D space it takes up.

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Volume is measured in cubic units e.g.  $\text{mm}^3$ ,  $\text{cm}^3$ ,  $\text{m}^3$ .

Volume of a cube =  $l^3$  = length of a side cubed

Volume of a cuboid =  $lwh$  =  $l \times w \times h$  = length x width x height

A **net** is a 2D shape that folds to make a 3D shape.

7) 112

1cm = 10mm

1m = 100cm

1km = 1000m

1l = 1000ml

1kg = 1000g

1t = 1000kg

1)

<b>Mode</b>	the number which appears most often in a set of numbers
<b>Bi-modal</b>	if there are two modes (two numbers which appear most).
<b>No mode</b>	if one number does not appear more times than any other.
<b>Median</b>	the number in the middle of the set when the numbers are listed in ascending order. If there are two numbers in the middle then calculate the number in the middle of them.
<b>Range</b>	find the largest and smallest numbers in the list and subtract them.
<b>Mean</b>	add up the numbers and divide by how many there are.

401- 420

2.

<b>Modal Class</b>	The group of data with the highest frequency
<b>Data Collection Sheet</b>	A table or chart for collecting data. It has a tally column and a frequency column .

415

3.

<b>Pie Chart</b>	A circle divided into slices called sectors.
<b>Dual Bar Chart</b>	Shows two sets of data.
<b>Compound Bar Chart</b>	Combines different sets of data in one bar.

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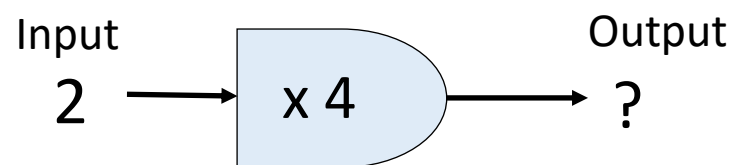
4)

<b>Like Terms</b>	Contain the same letter e.g. $3a + 5a = 8a$
<b>Expression</b>	Contains letters and numbers
<b>Equation</b>	Contains numbers, letters and an equals sign.  To solve an equation means to work out the value of the unknown number

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5)

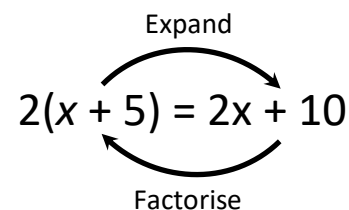
The function  $\times 4$  multiplies a number by four. The inverse function is  $\div 4$  because this reverses the effect of multiplying by four.



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6)

You can multiply out or expand expressions with brackets. Factorising is the reverse of expanding.



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### 1) Adding and subtracting decimals

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**Example:**

$$0.32 + 12.965 + 1.1$$

Line up the decimal points

$$\begin{array}{r} 0.320 \\ 12.965 \\ + 1.100 \\ \hline 14.385 \end{array}$$

'Pad' with zeros

**Example:**

$$51 + 14.02 + 2.1$$

$$\begin{array}{r} 51.00 \\ 14.02 \\ + 2.10 \\ \hline 67.12 \end{array}$$

Change whole number to decimal

### 2) Multiplying decimals

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**Multiplying by 0.5** is the same as **dividing by 2**

**Multiplying by 0.25** is the same as **dividing by 4**

**Multiplying by 0.1** is the same as **dividing by 10**

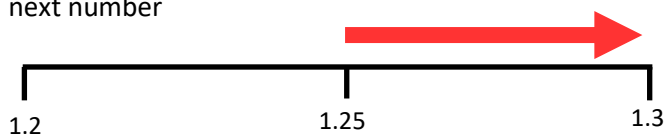
### 3) Ordering and rounding decimals

Ascending	Order from smallest to largest
Descending	Order from largest to smallest
>	Greater than
<	Less than

6   3   1   .   4   5   9  
 Hundreds   Tens   Units   Tenths   Hundredths   Thousandths

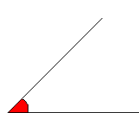
56

When rounding, if it ends in 5 or more round up to the next number

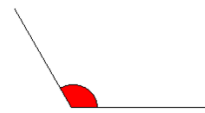


### 4) Types of angles

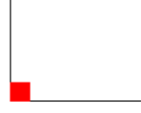
812



Acute Angle



Obtuse Angle



Right-angle



Reflex

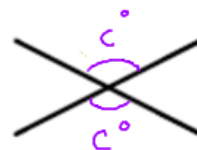
### 5) Angle facts

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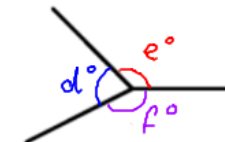


$$a^\circ + b^\circ = 180^\circ$$

Angles on a straight line add up to 180°



Vertically opposite angles are equal



$$d^\circ + e^\circ + f^\circ = 360^\circ$$

Angles around a point add up to 360°



$$g^\circ + h^\circ + i^\circ = 180^\circ$$

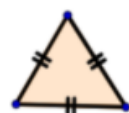
Angles in a triangle add up to 180°

626

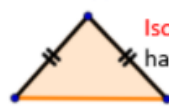
### 6) Types of triangles

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By Side



**Equilateral Triangle**  
has three equal sides

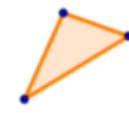


**Isosceles Triangle**  
has two equal sides



**Scalene Triangle**  
has no equal sides

By Angle



**Acute triangle**  
has three angles < 90°



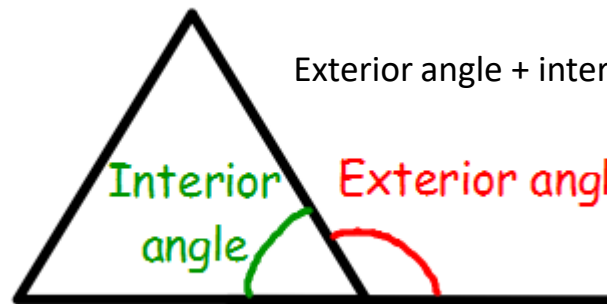
**Right triangle**  
has one angle = 90°



**Obtuse triangle**  
has one angle > 90°

### 6) Angles in polygons

561



$$\text{Exterior angle} + \text{interior angles} = 180^\circ$$

Interior angle   Exterior angle

1) The symbol  $^2$  means 'square' or multiply a number by itself.

The symbol  $\sqrt{\quad}$  means square root.

$1^2 = 1$	$7^2 = 49$	$\sqrt{1} = 1$
		$\sqrt{4} = 2$
$2^2 = 4$	$8^2 = 64$	$\sqrt{9} = 3$
		$\sqrt{16} = 4$
$3^2 = 9$	$9^2 = 81$	$\sqrt{25} = 5$
		$\sqrt{36} = 6$
$4^2 = 16$	$10^2 = 100$	$\sqrt{49} = 7$
		$\sqrt{64} = 8$
$5^2 = 25$	$11^2 = 121$	$\sqrt{81} = 9$
		$\sqrt{100} = 10$
$6^2 = 36$	$12^2 = 144$	99

2) The symbol  $^3$  means 'cube' or multiply a number by itself and by itself again.

The symbol  $\sqrt[3]{\quad}$  means cube root.

$1^3 = 1$	$\sqrt[3]{1} = 1$
$2^3 = 8$	$\sqrt[3]{8} = 2$
$3^3 = 27$	$\sqrt[3]{27} = 3$
$4^3 = 64$	$\sqrt[3]{64} = 4$
$5^3 = 125$	$\sqrt[3]{125} = 5$

100

4) Use BIDMAS for multistep calculations-

**B**rackets

**I**ndices

**D**ivision and **M**ultiplication

**A**ddition and **S**ubtraction

Indices mean powers like  $^2$ ,  $^3$ ,  $\sqrt{\quad}$  and  $\sqrt[3]{\quad}$ .

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5) Sequence	A set of numbers that follow a rule.
Term	Each number in a sequence is called a term.
Term-to-term rule	Tells you how to get from one term to the next.
Ascending sequence	Sequence with numbers that are increasing.
Descending sequence	Sequence with numbers that are decreasing.
Infinite	A sequence that carries on forever.
Finite	A sequence with a fixed number of terms.
Common difference	The difference between the terms.

197+

3) Multiple	The times table of a number
Factor	A whole number that divides exactly into another number.
Prime number	A number has exactly two distinct factors; 1 and itself.
Highest common factor (HCF)	The highest common factor (HCF) of two numbers is the largest number that is a factor of both numbers.
Lowest common multiple (LCM)	The lowest common multiple (LCM) of two numbers is the smallest number that is multiple of both numbers.
Prime factor decomposition.	Numbers written as a product (multiplication) of prime numbers.

27+

6) Arithmetic sequence	Goes up or down in equal steps.
Geometric sequence	The term-to-term rule is 'multiply or divide by a number'.

197+

7) Position-to-term rule	Tells you how to work out a term in a sequence when you know its position.
Nth term	Tells you how to work out any term in the sequence, called term n.

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1)

Numerator	The top number of a fraction.
Denominator	The bottom number of a fraction.
Improper Fraction	A fraction that has numerator that is bigger than its denominator.
Mixed Number	A mixed number has a whole number part and a fraction part.
Equivalent Fractions	Fractions that have the same value.
Simplest Form	Cancel down the fraction. Divide the numerator and denominator by their highest common factor.

60+

2)

Fraction of an amount	Divide the amount by the denominator and then multiply by the numerator.
Adding/ subtracting fractions	<ol style="list-style-type: none"> <li>1) Write equivalent fractions with the same denominator.</li> <li>2) Add/subtract the numerators.</li> <li>3) Keep the common denominator.</li> </ol>
Multiplying a fraction by an integer	<ol style="list-style-type: none"> <li>1) Multiply the numerator of the fraction by the integer.</li> <li>2) Keep the denominator the same.</li> <li>3) Simplify the fraction if possible.</li> </ol>
Multiplying fractions	Multiply the numerators and multiply the denominators.

65+

3)

Percent	Percent means out of 100. The symbol % is used.
1%	To find 1% divide the amount by 100.
10%	To find 10% divide the amount by 10.
50%	To find 50% divide the amount by 2.
84+ 25%	To find 25% divide the amount by 4.

4) Use one percentage to work out another, for example

84+

- $20\% = 10\% + 10\%$

Use more than one percentage to work out another, for example

- $40\% = 50\% - 10\%$
- $75\% = 50\% + 25\%$
- $80\% = 100\% - 10\% - 10\%$

Percentage of an amount using a calculator	<ol style="list-style-type: none"> <li>1) Write the percentage as a fraction with a denominator of 100.</li> <li>2) Multiply this fraction by the original amount.</li> </ol>
Write one number as a percentage of another.	<ol style="list-style-type: none"> <li>1) Write the numbers as a fraction.</li> <li>2) Find an equivalent fraction with denominator 100.</li> <li>3) The numerator is the percentage.</li> </ol>

1) Probability	The chance of something happening.	
Even chance	Something is as likely to happen as not happen. Also called 'equally likely' or 'fifty-fifty'.	
Event	Something that might happen. For example rolling a 6 on a die.	
Fair	If all events are equally likely.	
Biased	If one event is more likely than another.	351+

2) Probability Scale

351+



When you are asked to DESCRIBE a probability, use the words above.

If you are asked to calculate a probability you can give your answer as a fraction, decimal or percentage.

0	0.25	0.5	0.75	1
0	25%	50%	75%	100%
0	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1

3) Outcome	The possible results of an event.	351+
Outcomes of rolling a die	1, 2, 3, 4, 5 or 6.	
At random	Choosing something at random means all outcomes are equally likely to happen.	
Successful outcomes	The outcomes that you want.	
Successful outcome example	If you want to choose a vowel at random from the letters of the alphabet, then choosing A,E, I, O or U would be a successful outcome	

4) P(X)	Means 'the probability of X happening'.	
P(green or blue)	Means 'the probability of getting green or blue'.	
P(event not happening)	$1 - P(\text{event happening})$	351+

5) Probability of an event happening =  $\frac{\text{Number of successful outcomes}}{\text{Total number of outcomes}}$

Theoretical probability is calculated without doing an experiment.

Relative frequency of a value =  $\frac{\text{Frequency of value}}{\text{Total frequency}}$

Probability can be used to model what happens in the future.

Experimental probability of an outcome =  $\frac{\text{Number of successful outcomes}}{\text{Total number of outcomes}}$

More data = more confidence

356+

6)

This angle could be called

- Angle ABC
- Angle CBA
- $\angle ABC$
- $\angle CBA$
- $\hat{A}BC$
- $\hat{C}BA$

Parallel lines

Perpendicular lines

Meet at a right angle ( $90^\circ$ ).

Triangle ABC

acute right obtuse straight reflex