

Key facts and vocabulary

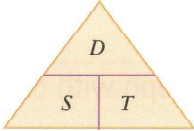
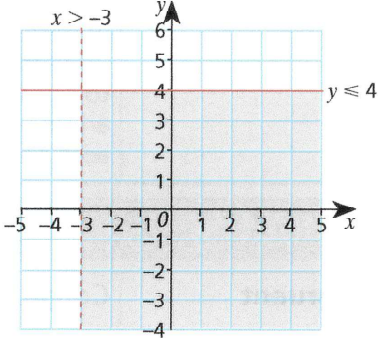
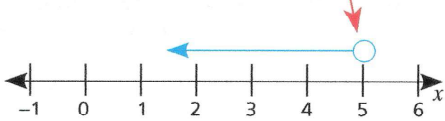
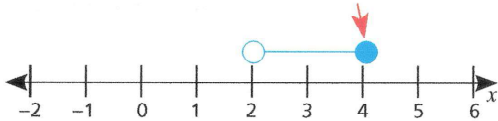
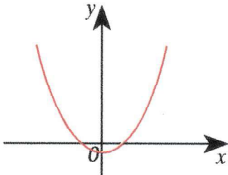
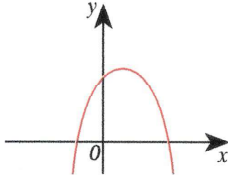
Number

Sequence of square numbers	1, 4, 9, 16, 25, 36, 49, ...
Sequence of triangular numbers	1, 3, 6, 10, ...
Standard form	A number written as $A \times 10^n$ $1 \leq A < 10$ n is an integer Large numbers have positive n : $4.3 \times 10^6 = 4\,300\,000$ (6 places) Numbers less than 1 have negative n : $2.5 \times 10^{-4} = 0.00025$ (4 places)

Algebra

Changing the subject of a formula	Rearranging the terms in a formula so a different variable is on its own on one side of the equals sign For example: $S = \frac{D}{T}$ $D = S \times T$ S is the subject D is the subject Think of rearranging formulae as the same as solving equations. Get the new subject of the formula on its own by using inverse operations.									
Compare lines from their equations	Rearrange the equations so both are in the form $y = mx + c$ Compare the gradients (m values) Compare the y -intercepts (c values) Parallel lines have the same gradient (m value)									
Distance–time graph	Graph showing time on horizontal axis and distance on vertical axis Gradient = speed									
Expand a single pair of brackets	Multiply every term inside the bracket by the term outside the bracket $3(x + 4) = 3x + 12$ $5(2y - 1) = 10y - 5$									
Expand two pairs of brackets	Multiply every term in the first bracket by every term in the second bracket Grid method $(2x + 3)(x - 4)$ <table border="1" style="display: inline-table; margin: 10px;"> <tr> <td></td> <td>$2x$</td> <td>$+3$</td> </tr> <tr> <td>x</td> <td>$2x^2$</td> <td>$3x$</td> </tr> <tr> <td>-4</td> <td>$-8x$</td> <td>-12</td> </tr> </table> $= 2x^2 - 5x - 12$ FOIL method $(a + b)(c + d)$		$2x$	$+3$	x	$2x^2$	$3x$	-4	$-8x$	-12
	$2x$	$+3$								
x	$2x^2$	$3x$								
-4	$-8x$	-12								

Key facts and vocabulary

Expand three pairs of brackets	<p>Expand the first pair of brackets: $(2x + 3)(x - 4)(x - 3) = (2x^2 - 5x - 12)(x - 3)$</p> <p>Then multiply every term in the first bracket by every term in the second bracket: $(2x^2 - 5x - 12)(x - 3) = 2x^3 - 11x^2 + 3x + 36$</p>
Formula	<p>A rule connecting two or more variables or quantities</p> <p>The formula for speed is: $\text{Speed} = \frac{\text{distance}}{\text{time}}$</p> 
Inequalities on a graph	<p>For $x > -3$, draw the graph of $x = -3$ with a dashed line; shade the region where $x > -3$</p> <p>For $y \leq 4$, draw the graph of $y = 4$ with a solid line; shade the region where $y \leq 4$</p> <p>For $y \geq mx + c$, draw the graph of $y = mx + c$ with a solid line; test points either side of the line to see which side to shade</p> 
Inequalities on a number line	<p>$x < 5$: 5 is not included</p>  <p>$2 < x \leq 4$: 4 is included</p> 
Quadratic graphs	<p>Quadratic graph with a positive x^2 term</p>  <p>Quadratic graph with a negative x^2 term</p>  <p>Quadratic graphs are symmetrical U-shaped curves</p>
Solve	<p>To solve an equation, find the value of the unknown letter</p> <p>When solving an equation, carry out the same operations to both sides at each step.</p>
Solve an equation with brackets	<p>Expand the brackets first</p>
Solve an equation with fractions	<p>To 'undo' the fraction, multiply both sides by the denominator</p> <p>When there are fractions on both sides, multiply both sides by the lowest common multiple (LCM) of their denominators</p>
Solve an equation with x on both sides	<p>Use inverse operations to get all the x terms on one side, and all the numbers on the other</p>
Solve an inequality	<p>Solve in the same way as an equation, by doing the same to both sides</p> <p>If you multiply or divide both sides by a negative number, reverse the inequality sign:</p> $-y > 3$ $\times -1 \quad \times -1$ $y < -3$

Key facts and vocabulary

Solve simultaneous equations using graphs

Plot the graphs of the two equations

The solutions are the x - and y -values where the two lines cross
 $x = 1, y = 7$

Velocity-time graph

Graph with time on the horizontal axis and velocity (speed) on the vertical axis

A positive gradient (where the line slopes upwards from left to right) means that an object/person is accelerating

A straight line means that an object/person is moving at a constant speed

A negative gradient (where the line slopes downwards from left to right) means that an object/person is slowing down (decelerating)

Geometry

Congruent

Congruent shapes are exactly the same shape and size

Two triangles are congruent if one or more of these four criteria are true:

Side, Side, Side (SSS)	Side, Angle, Side (SAS)	Angle, Side, Angle (ASA)	Right angle, Hypotenuse, Side (RHS)

Cross section

A cross section is the 2D shape that is made when cutting through a 3D shape

Line of symmetry

Mirror line that divides a shape in half, so each half is a reflection of the other

In a regular polygon,
 number of lines of symmetry = number of sides

Order of rotational symmetry

The number of times a shape 'lands on itself' when it is rotated a full turn

In a regular polygon,
 the order of rotational symmetry = number of sides

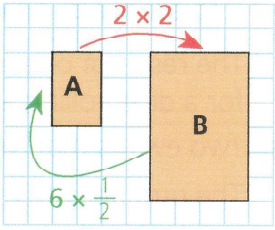
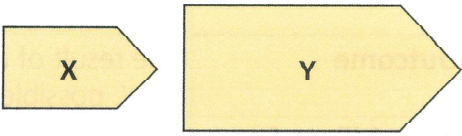
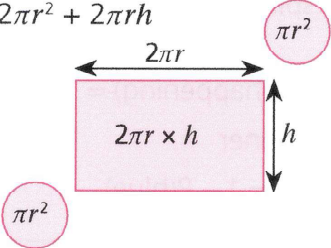
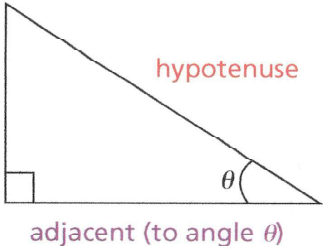
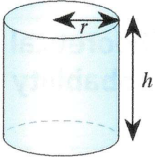
Pythagoras' theorem

$c^2 = a^2 + b^2$

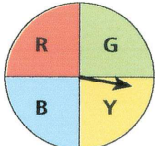
c is the length of the hypotenuse

a and b are the lengths of the two shorter sides

Key facts and vocabulary

Scale factor	<p>The number all side lengths are multiplied by in an enlargement</p> <p>A to B: enlargement scale factor 2 B to A: enlargement scale factor $\frac{1}{2}$</p> 
Similar	<p>Similar shapes are enlargements of each other</p> <ul style="list-style-type: none"> • Same angles • Same shape but different sizes • Each side length has been multiplied by the same scale factor 
Surface area	<p>The total area of all the faces of a 3D shape</p>
Surface area of a cylinder	<p>Surface area of a cylinder = $2\pi r^2 + 2\pi rh$</p> 
Trigonometry ratios	<p> $\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{\text{opp}}{\text{hyp}}$ $\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{\text{adj}}{\text{hyp}}$ $\tan \theta = \frac{\text{opposite}}{\text{adjacent}} = \frac{\text{opp}}{\text{adj}}$ </p> <p>You can remember these using</p> <p style="text-align: center;"> S O H C A H T O A </p> <p style="text-align: center;"> $\sin = \frac{\text{opp}}{\text{hyp}}$ $\cos = \frac{\text{adj}}{\text{hyp}}$ $\tan = \frac{\text{opp}}{\text{adj}}$ </p> 
Volume of a cylinder	<p>Volume of a cylinder = area of circular cross section × height $= \pi r^2 h$</p> 
Volume of a prism	<p>Volume of a prism = area of cross section × length</p>

Probability

Biased	<p>The outcomes are not equally likely; the opposite of 'fair'</p>
Equally likely	<p>All the outcomes have an equal probability of happening In this spinner, the events R, G, B and Y are all equally likely</p> 
Expected result	<p>Expected result = $P(\text{event}) \times \text{number of trials}$ For rolling a dice 30 times, expected number of 3s = $\frac{1}{6} \times 30 = 5$</p>

