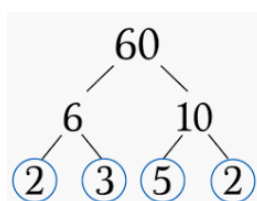


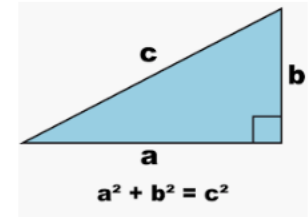
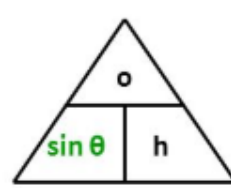
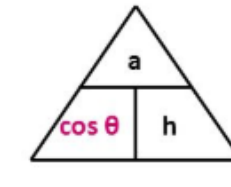
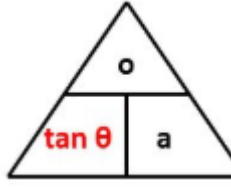
Number: Types of number

1	Multiply and divide positive and negative numbers	<p>Remember the rules:</p> <p>$++ = +$</p> <p>$-- = +$</p> <p>$-+ = -$</p> <p>$+ - = -$</p>
2	LCM – Lowest Common Multiple	<p>Lowest number that is in both timetables.</p> <p>3: 3, 6, 9, 12</p> <p>4: 4, 8, 12, 16</p>
3	HCF – Highest Common Factor	<p>Highest factor that is in both numbers</p> <p>18: 1, 2, 3, 6, 9, 18</p> <p>24: 1, 2, 3, 4, 6, 8, 12, 24</p>
4	Product of primes	<p>Factor trees</p>  <p>$2^2 \times 3 \times 5$</p>

Algebra: Sequences

1	Term to term rule	How do you get from one term to the other
2	Nth term	Difference x n + zero term

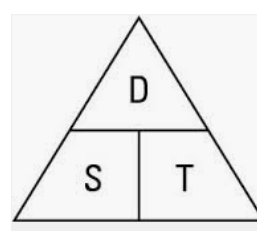
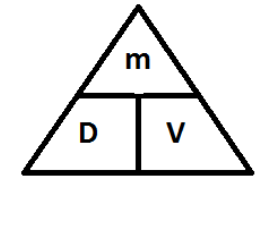
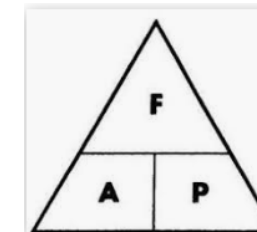
Geometry: Trigonometry

1	Pythagoras' Theorem	
2	SOHCAHTOA (cover up the one you need)	  

Key Vocabulary

1	Integer	Whole number that can be positive, negative or zero.
2	Factor	A number that goes into another number with no remainders
3	Product	Another word for multiply
4	Geometric	Multiple by the same value to get the next term
5	Fibonacci	Add the previous 2 terms to get the next .
6	Hypotenuse	The longest side of a right-angled triangle, opposite the right angle
7	Term	Each number in a sequence. The 1 st number is the 1 st term.

Ratio and Proportion: Compound measure

<p>Speed, Distance, Time</p> 	<p>Density, Mass, Volume</p> 	<p>Pressure, Force, Area</p> 
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Algebra: Working with symbols

1	Collecting like terms	e.g. $3x + 7 + 8x^2 + 2x - 10 = 8x^2 + 5x - 3$ (x^2 and x cannot be collected together when added or subtracted)
2	Substitution	Replace the letters with numbers. $x=8$ and $y=-2$ Find $3x+2y$ $(3 \times 8) + (2 \times -2) = 24 - 4 = 20$
3	Expand single brackets	Multiple the outside of the brackets with all of the inside. $3(x - 3) = 3x - 9$
4	Expand double brackets	$(x - 9)(x + 6)$ $x^2 + 6x - 9x - 54$ Simplify: $x^2 - 3x - 54$
5	Factorise	$4x + 32 = 4(x + 8)$
6	Factorise quadratics	$x^2 + 7x + 12$ 2 numbers that X to give 12 and + to give 7 $(x + 3)(x + 4)$

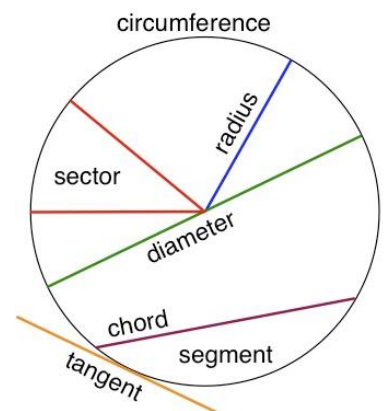
Number: Percentages

1	One quantity as a % of another	Find 30 as a % of 78. $30/78 \times 100 = 38.5\%$
2	% increase and decrease	Increase 30 by 25% $30 \times 1.25 = 37.5$ Decrease 40 by 35% $40 \times 0.65 = 26$
3	Find a %	$\frac{\text{Change}}{\text{Original}} \times 100$
4	Compound interest	$A = P(1+i)^n$ A = final amount including principal P = principal amount i = interest rate per year n = number of years invested

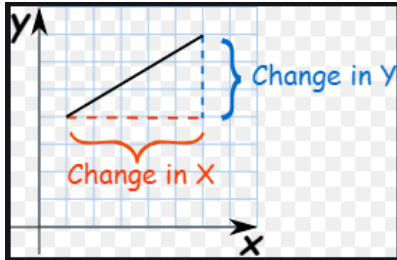
Ratio and Proportion: Ratio

1	Relationship between fractions and ratio	5 blue sweets 2 red <u>Ratio 5:2</u> <u>Fraction of blue 5/7</u>
2	Direct proportion	$y \propto x$ $y = kx$ for a constant k

Geometry: Area and Perimeter

1	Circumference Perimeter	$\pi \times \text{Diameter}$
2	Parallelogram Area	Base \times perpendicular height
3	Trapezium Area	$(a+b) \times \text{perpendicular height} / 2$
4	Triangle Area	Base \times perpendicular height / 2
5	Parts of a circle	
6	Circle Area	$\pi \times \text{Radius}^2$

Algebra: Linear graphs

1	Draw the graph $y=3x+4$	<table border="1" style="background-color: #e0e0e0;"> <tr> <td>x</td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> </tr> <tr> <td>y</td> <td>-2</td> <td>1</td> <td>4</td> <td>7</td> </tr> </table>	x	-2	-1	0	1	y	-2	1	4	7
x	-2	-1	0	1								
y	-2	1	4	7								
	$y = mx + c$	<p>m = gradient ie. How steep the curve is</p> <p>c = y intercept ie. Where the graph crosses the y axis</p>										
2	Gradient of a line	<p>$y=mx+c$ (m is the gradient)</p>  <p>To calculate the gradient: $m=y/x$</p>										
3	Parallel lines	If m is the same. The lines are parallel										

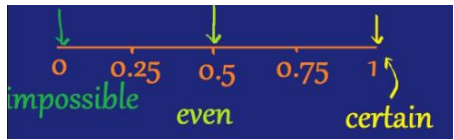
Statistics: Averages

1	Mode	Most common number in a data set
2	Median	The middle number when all numbers are in order
3	Mean	Add all the data up and divide by how many there are
4	Range	Highest value – lowest value
5	Mean from a frequency table	Create a fX column and multiply x by the frequency Add the answers together then divide by the total frequency

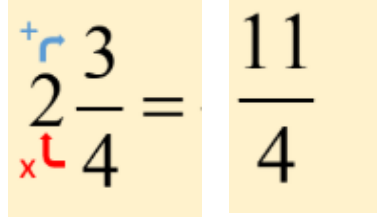
Key Vocabulary

1	Rhombus	A rhombus looks like a square that has fallen over.. All sides have equal length. Opposite sides are parallel, and opposite angles are equal (it is a Parallelogram).
2	Quadrilateral	The name given to any 4 sided 2D shape.
3	Interior	Inside Interior angle: angle inside the shape.
4	Polygon	Any 2D shape with straight lines
5	Sum	Another word for add
6	Expression	Combination of different terms with no equal sign
7	Quadratic	Contains the term x^2
8	Proportion	Part of a whole.

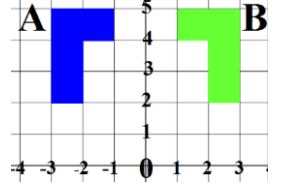
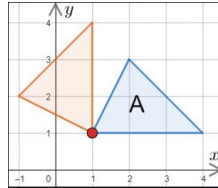
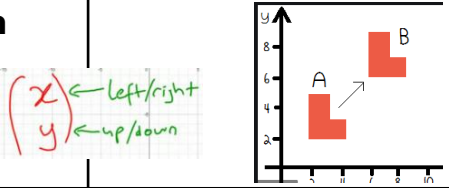
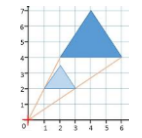
Statistics: Probability

1	Probability scale	
2	Mutually exclusive	Events that cannot happen at the same time. E.g flipping a head and a tail
3	Expected probability	Generating expected numbers based on theory. Eg if you flip a coin 100 times you would expect 50 heads as the probability is 0.5 (0.5 x 100 = 50)
4	Relative frequency	Probability generated from an experiment. Eg. If you roll a dice 50 times and get 7 6s. The experimental probability is 7/50

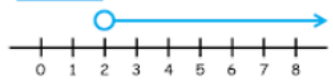

Number: Fractions and decimals

1	Add and subtract fractions	Make sure the denominators are the same before adding / subtracting the numerators
2	Multiply and divide fractions	<u>Multiplying:</u> multiply numerators together then multiply the denominators together <u>Dividing:</u> Keep the first fraction Flip the second fraction then change the divide sign to multiply.
3	Convert mixed numbers/ improper fractions	

Geometry: Transformations

1	Reflection (in the y-axis)	
2		Rotation 90 degree, anti-clockwise about (1,1)
3	Translation Use vector notation	
4		Enlargement : Sf 2 from (0,0)

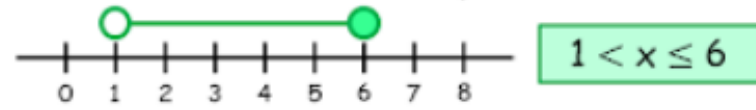
Algebra: Equations

1	Solve one step equations	$5x=60$ $x=60/5$ $x=12$	3	x on both sides	$3x+2=6x-5$ $2=6x-3x-5$ (move the smaller x first) $2+5=3x$ $7=3x$ $7/3 = x$ so $x = 7/3$
2	Solve two step equations	$4x - 8 = 24$ $4x = 32$ $x = 32/4$ $x = 8$	4	Inequalities on a number line	<p>An open circle means that the value is not included:</p> <p>$x > 2$ x is greater than 2</p>  <p>A filled in circle means that the value is included:</p> <p>$x \geq 3$ x is greater than or equal to 2</p> 

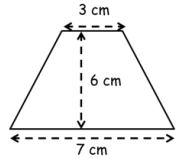
Key Vocabulary

1	Reciprocal	The reciprocal of a number is: 1 divided by the number
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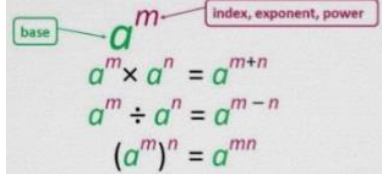
If x is **between** two values, use **two circles**:



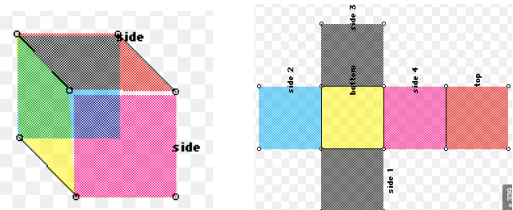
Algebra: Formula

1	Substitute numbers into a formula	<p>Eg. Substitute numbers into the formula for the area of a trapezium:</p>  $\frac{(a + b)h}{2} = \frac{(3 + 7) \times 6}{2} = 30$
2	Rearranging formula	<p>Make a the subject of the formula</p> $b = 5a + 21$ $b - 21 = 5a$ $\frac{b - 21}{5} = a$

Number: Indices

1	Squared numbers	$1^2 = 1 \times 1 = 1$ $2^2 = 2 \times 2 = 4$ $3^2 = 3 \times 3 = 9$										
2	Cubed numbers	$1^3 = 1 \times 1 \times 1 = 1$ $2^3 = 2 \times 2 \times 2 = 8$ $3^3 = 3 \times 3 \times 3 = 27$										
2	Index laws											
3	Standard form	<table border="1"> <thead> <tr> <th>Ordinary Number</th> <th>Standard Form</th> </tr> </thead> <tbody> <tr> <td>29</td> <td>2.9×10^1</td> </tr> <tr> <td>350</td> <td>3.50×10^2</td> </tr> <tr> <td>0.3</td> <td>3×10^{-1}</td> </tr> <tr> <td>0.09</td> <td>9×10^{-2}</td> </tr> </tbody> </table>	Ordinary Number	Standard Form	29	2.9×10^1	350	3.50×10^2	0.3	3×10^{-1}	0.09	9×10^{-2}
Ordinary Number	Standard Form											
29	2.9×10^1											
350	3.50×10^2											
0.3	3×10^{-1}											
0.09	9×10^{-2}											

Geometry: Area and volume

1	Covert squared units	$3cm^2$ to m^2 Cm to m = $\div 100$ Square this conversion 100^2 $3 \div 100^2 = 0.0003m^2$
2	Convert cubed units	$3m^3$ to cm^3 M to cm = $\times 100$ Square this conversion 100^2 $3 \times 100^2 = 30'000cm^2$
3	Vol of cube/cuboid Vol of prisms	Volume = length x width x height Vol = Cross section area x length
4	Surface area of prisms (work out the area of each side)	

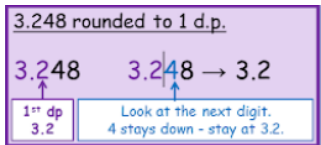
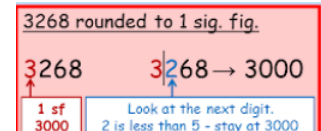
Key Vocabulary

1	Expression	Numbers, symbols and operators (such as + and x) grouped together with no equals sign
2	Equation	$4x+7=5$ terms that's are equal.
3	Formula	Has an = and 2 or more terms. It can help work out area, volume, speed etc.

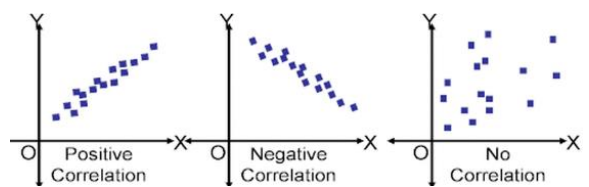
Geometry: Scale

Appropriate measures	The height of a door is approximately 2 metres
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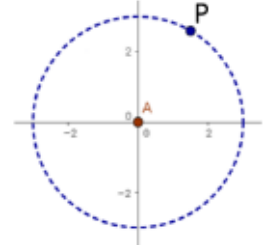
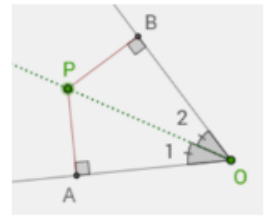
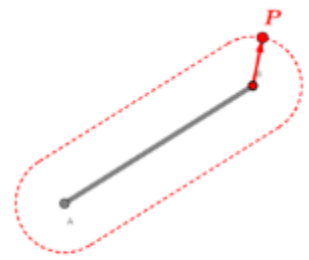
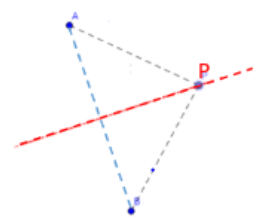
Number: Decimals

1	Round to decimal places (dp)	
2	Round to significant figures (sf)	

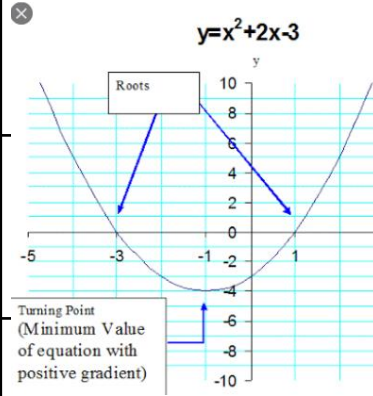
Statistic: Representing data

1	Data handling cycle	1) Specify the problem/ pick hypothesis 2) Collect data 3) Process the data and represent on a graph 4) Interpret and discuss the results																								
2	Pie Chart	<table border="1"> <thead> <tr> <th>Comedy</th> <th>Action</th> <th>Romance</th> <th>Drama</th> <th>SciFi</th> <th>TOTAL</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>5</td> <td>6</td> <td>1</td> <td>4</td> <td>20</td> </tr> <tr> <td>20%</td> <td>25%</td> <td>30%</td> <td>5%</td> <td>20%</td> <td>100%</td> </tr> <tr> <td>$4/20 \times 360^\circ = 72^\circ$</td> <td>$5/20 \times 360^\circ = 90^\circ$</td> <td>$6/20 \times 360^\circ = 108^\circ$</td> <td>$1/20 \times 360^\circ = 18^\circ$</td> <td>$4/20 \times 360^\circ = 72^\circ$</td> <td>360°</td> </tr> </tbody> </table>	Comedy	Action	Romance	Drama	SciFi	TOTAL	4	5	6	1	4	20	20%	25%	30%	5%	20%	100%	$4/20 \times 360^\circ = 72^\circ$	$5/20 \times 360^\circ = 90^\circ$	$6/20 \times 360^\circ = 108^\circ$	$1/20 \times 360^\circ = 18^\circ$	$4/20 \times 360^\circ = 72^\circ$	360°
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3	Histogram	Like a bar chart but uses continuous data and all the bars are touching. Frequency is measured by the area of the bar.																								
4	Scatter graphs																									

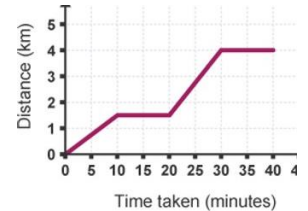
Geometry: Loci

 <p>Locus of points equidistant from a point A will form a circle with center A.</p>	 <p>Locus of points that are equidistant from two lines will bisect the angle formed by the two lines.</p>
 <p>Locus of points equidistant from a line segment.</p>	 <p>Locus of points equidistant from two points A and B forms a perpendicular bisector of the line AB.</p>

Algebra: Quadratics

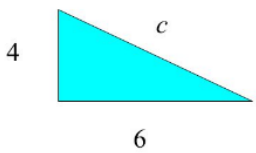
1	Use a value table to draw $y = x^2$	<table border="1"> <tr> <td>x</td> <td>-3</td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>y</td> <td>9</td> <td>4</td> <td>1</td> <td>0</td> <td>1</td> <td>4</td> <td>9</td> </tr> </table>	x	-3	-2	-1	0	1	2	3	y	9	4	1	0	1	4	9
x	-3	-2	-1	0	1	2	3											
y	9	4	1	0	1	4	9											
2	Roots = -3 and 1																	
3	y intercept = -3																	
4	Turning point (-1, -4)																	

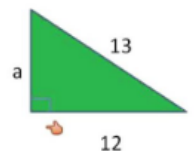
Algebra: Graphs

1	Speed distance time graph	10m – 20m They have Stopped moving	
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Key Vocabulary		
1	Construct	Draw with a compass and ruler
2	Interpret	Say what the results mean

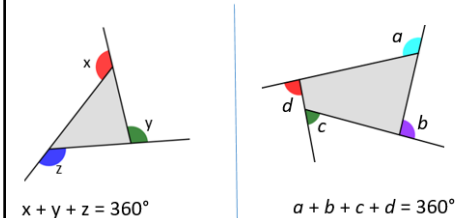
Geometry: Pythagoras

1	Finding the hypotenuse	<p>Find c.</p> $a^2 + b^2 = c^2$ $4^2 + 6^2 = c^2$ $c^2 = 52$ $c = \sqrt{52}$ $c = 7.21$	
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2	Finding the shorter side	<p>Find the Value of a:</p> $c^2 = a^2 + b^2$ $a^2 = c^2 - b^2$ $a = \sqrt{c^2 - b^2}$ $a = \sqrt{13^2 - 12^2}$ $a = \sqrt{169 - 144}$ $a = \sqrt{25}$ $a = 5$	
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3	Prove it's a right angle triangle	<p>A triangle has the sides 3cm, 4cm and 6cm. Is this a right angle triangle?</p> $a^2 + b^2 = c^2$ $3^2 + 4^2 = 6^2$ $9 + 16 = 36$ $25 \neq 36 \text{ (they are not equal)}$ <p>It is not a right angle triangle.</p>	
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Geometry: Angles

1	Sum of Interior angles	$(n - 2) \times 180^\circ$ <p>N is the number of sides.</p>
2	Sum of Exterior angles	<p>Sum of exterior angles of any shape always add to 360</p>  <p>$x + y + z = 360^\circ$</p> <p>$a + b + c + d = 360^\circ$</p>

Key Vocabulary

1	Hypotenuse	Side opposite the right angle on a right angle triangle (longest side)
2	Interior	Inside
3	Exterior	Outside
4	Scalar	A scalar has only magnitude (size)
5	Vector	A vector has magnitude and direction

Geometry: vectors

1	Add and subtract vectors	<p>If $\mathbf{x} = \begin{pmatrix} a \\ b \end{pmatrix}$ and $\mathbf{y} = \begin{pmatrix} c \\ d \end{pmatrix}$</p> $\mathbf{x} + \mathbf{y} = \begin{pmatrix} a+c \\ b+d \end{pmatrix}$ $\mathbf{x} - \mathbf{y} = \begin{pmatrix} a-c \\ b-d \end{pmatrix}$
2	Multiplication of a vector by a scalar	$4 \times \begin{bmatrix} 1 \\ 2 \end{bmatrix} = \begin{bmatrix} 1 \times 4 \\ 2 \times 4 \end{bmatrix} = \begin{bmatrix} 4 \\ 8 \end{bmatrix}$
3	Represent a vector on a diagram	See diagram opposite

