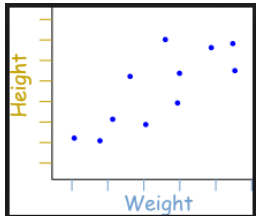
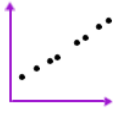


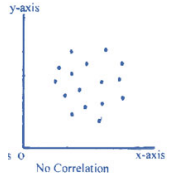


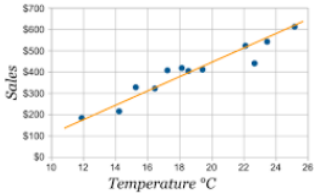
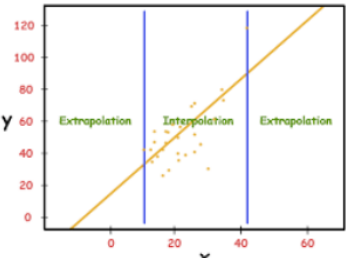
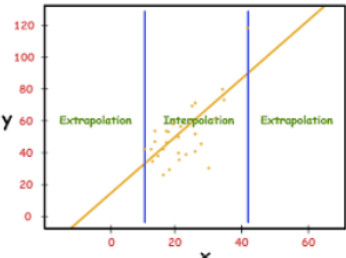
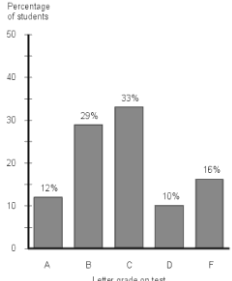
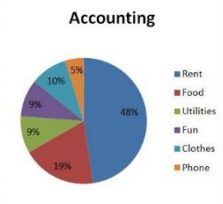
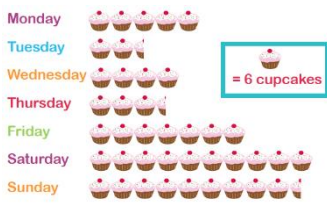


YEAR 8

Knowledge Organisers

Maths 8.1 Topic 1

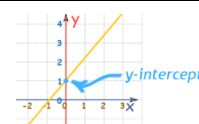
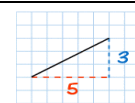
Term		Definition
1	Discrete data	Data that can only take certain values. E.g. the number of students in a class, your shoe size, number of cars in the car park.
2	Continuous data	Data that can take any value. E.g. temperature, time taken to run a race, height.
3	Grouped data	Data that has been grouped together into categories.
4	Primary data	Data collected yourself. E.g. you design and complete a survey of students yourself.
5	Secondary data	Data collected from somewhere else that you did not collect. E.g. data from a Government census.
6	Median	- The "middle" of a sorted list of numbers. - To find the Median, place the numbers in value order and find the middle number.
7	Mean	The Arithmetic Mean is the average of the numbers: a calculated "central" value of a set of numbers. To calculate it: <ul style="list-style-type: none"> • add up all the numbers, • then divide by how many numbers there are.
8	Mode	The number which appears most often in a set of numbers.
9	Range	The difference between the lowest and highest values.
10	Scatter graphs	A graph of plotted points that show the relationship between two sets of data. <div style="text-align: right;">  </div>
11	Bivariate data	- Data involving two sets of related variables e.g. Height and Weight. - It is often shown on a scatter graph.
12	Correlation	A relationship between two or more things. <div style="text-align: center;"> <div style="display: flex; justify-content: space-around; margin-bottom: 10px;"> <div style="text-align: center;"> <p>Perfect Positive Correlation</p>  <p>1</p> </div> <div style="text-align: center;"> <p>High Positive Correlation</p>  <p>0.8</p> </div> <div style="text-align: center;"> <p>Low Positive Correlation</p>  <p>0.3</p> </div> </div> </div>
13	No Correlation	Where there lies no relationship between two variables. The two variables have nothing to do with each other. <div style="text-align: right;">  </div>

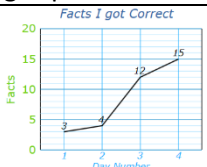
14	Line of best fit	A line drawn on a scatter graphs that has roughly the same number of points above the line as below the line, passing through as many points as possible.	
15	Interpolation	This is when you use estimate a value from within your data set. It is a useful skill to have.	
16	Extrapolation	Extrapolation is when you estimate a given value outside of your given data range. It is extremely dangerous to do this as you do not know for certain if the relationship you have identified continues before or outside of your data values.	
17	Frequency table	A table to record the number of times (frequency) that an event has happened.	
18	Bar chart	A way of representing data where the bars are represented by heights or lengths of lines or rectangles with equal width.	
19	Pie Chart	A type of graph in which a circle is divided into sectors that represent a proportion of the whole.	
20	Pictogram	A way of illustrating data by using pictures, and parts of pictures to represent given numbers.	
21	First decimal place	First number after the decimal place	
22	Second decimal place	Second number after the decimal place	
23	First significant figure	First non zero digit in a number	
24	Second significant figure	Digit directly after the non zero number	

25	Approximate	To guess or estimate
26	To approximate a sum	<ol style="list-style-type: none"> 1. Round digits to 1 significant figure 2. Complete sum
27	Bounds	<p>Either of these two:</p> <p>Lower bound: a value that is less than or equal to every element of a set of data.</p> <p>Upper bound: a value that is greater than or equal to every element of a set of data.</p>
28	Numerator	Number of equal parts we want. The top number of a fraction.
29	Denominator	Total number of equal parts. The bottom number of fraction.
30	Proper Fraction	A fraction where the numerator is less than the denominator. The value is less than 1.
31	Improper fraction	A fraction where the numerator is greater than the denominator. The value is more than 1.
32	Mixed number	The mixed number is made of a whole number and a fraction
33	Simplest form	A fraction is in simplest form when the numerator and denominator cannot be any smaller (while still being whole numbers).
34	Simplify fraction	To put a fraction into its simplest form
35	Terminating decimal	Any fraction that has a finite number of digits (the digits do not continue forever).
36	Recurring decimal	A decimal number that has digits that repeat forever.
37	Percent	% means out of 100

Maths 8.2 Topic 2

Term		Definition
1	Equations	An equation is a mathematical statement that two things are equal in value. It consists of two expressions, one on each side on an equals sign. E.g. $x + 3 = 10$
2	Inverse	Opposite in effect. The reverse of. The inverse of adding 9 is subtracting 9. The inverse of multiplying by 5 is dividing by 5. There are many inverses in mathematics!
3	Substitution	Putting values where the letters are. E.g. $3x + 5$ Substitute $x = 4$ into the expression. $3(4) + 5 = 17$
4	Expressions	An algebraic expression involves letter that represent numbers. They do not have an equals sign. For example, a or $6b$ or $x^2 + y^2 + z^2$ are all expressions.
5	Linear equation	A straight line where all terms have the power 1 with no x^2 or x^3 terms.
6	Brackets	$5(x + 2) = 5x + 10$
7	Solve	To find a value (or values) we can put in place of a variable that makes the equation true. Example: $x + 2 = 7$ The variable is x , when we put 5 in place of x we get $5 + 2 = 7$, and $5 + 2 = 7$ is true, so $x = 5$, and the equation is solved.
8	Term-to-term rule	When you have a sequence and can work out the following numbers. E.g. find the next three terms of this sequence, 10, 20, 30, ..., ..., ...
9	Position-to-term rule	This is an explicit rule you can find which allows you to find the 100 th term quite easily. E.g. $5n + 7$. 100 th term = $5(100) + 7 = 507$
10	Arithmetic progression	A sequence that goes up or down by the same amount each time.
11	Geometric progression	A sequence with a constant ratio between each number and the one before. E.g. 1, 3, 9, 27, 81. Formula for a geometric progression = $a \times r^{n-1}$ A = First term R = common ratio (what do you multiply by each time)
12	Nth term	A formula that allows you to work out the rule for a sequence.
13	Gradient	How steep a line is. In this example the gradient is $3/5 = 0.6$ Also called "slope".
14	Y intercept	The point where a line or curve crosses the y-axis of a graph. In other words: find the y value when x equals 0

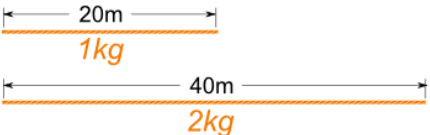


15	Quadratic	<p>Where the highest exponent of the variable (usually "x") is a square (2).</p> <p>So it will have something like x^2</p> <p>$5x^2 + 3x + 3 = 0$ <i>this makes it Quadratic</i></p>										
16	Speed	<p>How fast something is moving.</p> <p>Measured as distance travelled per unit of time.</p> <p>Example: The speed of these cars is over 150 kilometres per hour (150 km/h).</p>										
17	Function	A special relationship where each input has a single output.										
18	Formula	<p>A rule or fact written with mathematical symbols.</p> <p>It usually has:</p> <ul style="list-style-type: none"> • an equals sign (=) • two or more variables (x, y, etc) 										
19	Distance	Length. A measurement of how far through space.										
20	Graph	<p>A diagram of values, usually shown as lines.</p>  <table border="1"> <caption>Facts I got Correct</caption> <thead> <tr> <th>Day Number</th> <th>Facts</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>3</td> </tr> <tr> <td>2</td> <td>4</td> </tr> <tr> <td>3</td> <td>12</td> </tr> <tr> <td>4</td> <td>15</td> </tr> </tbody> </table>	Day Number	Facts	1	3	2	4	3	12	4	15
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Maths 8.3 Topic 3

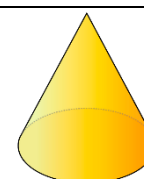
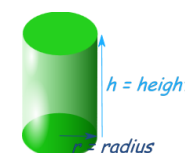
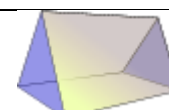
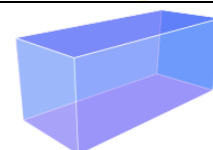
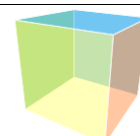
Term		Definition
1	Percentage	A rate, number or amount out of 100.
2	Reverse percentage	When you are given a percentage that is not 100% and a value, and you need to work out the original value (100%). E.g. 40% = 24. So 10% = 6 So 100% = 60.
3	Multiplier	A number you can multiply by to do percentage increase or decrease in one step. E.g. Increase by 7% = Multiply by 1.07 Decrease by 8% = Multiply by 0.92
4	Percentage change	$Percentage\ change = \frac{change}{original} \times 100$
5	Increase	Make something bigger (in size or quantity).
6	Decrease	Make something smaller (in size or quantity).
7	Interest	As a percent (per year) of the amount borrowed
8	Annual	Something that happens once a year.
9	Proper Fraction	A fraction where the numerator is less than the denominator. The value is less than 1.
10	Improper fraction	A fraction where the numerator is greater than the denominator. The value is more than 1.
11	Mixed number	The mixed number is made of a whole number and a fraction
12	Simplest form	A fraction is in simplest form when the numerator and denominator cannot be any smaller (while still being whole numbers).
13	Simplify fraction	To put a fraction into its simplest form

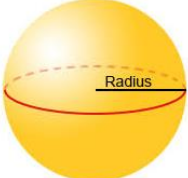


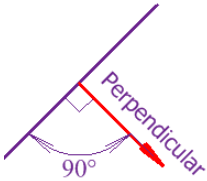
Maths 8.4 Topic 4

Term		Definition
1	Ratio	A ratio shows the relative sizes of two or more values. Example: if there is 1 boy and 3 girls you could write the ratio as: 1:3 (for every one boy there are 3 girls)
2	Proportion	Proportion says that two ratios (or fractions) are equal. Example: $1/3 = 2/6$
3	Proportional	When quantities have the same relative size. In other words they have the same ratio. Example: A rope's length and weight are in proportion. When 20m of rope weighs 1kg, then: <ul style="list-style-type: none"> • 40m of that rope weighs 2kg • 200m of that rope weighs 10kg etc. 
4	Directly proportional	Directly proportional: as one amount increases, another amount increases at the same rate.
5	Inversely proportional	Inversely Proportional: when one value decreases at the same rate that the other increases. Example: speed and travel time. As speed goes up, travel time goes down And as speed goes down, travel time goes up
6	Metric Unit	Unit of measurement in the metric system. Metric units include metre, centimetre, millimetre, kilometre, gram and kilogram.
7	Multiplier	The number that you are multiplying by.
8	Speed	How fast something is moving. Measured as distance travelled per unit of time. Example: The speed of these cars is over 150 kilometres per hour (150 km/h).
9	Compound units	Units with two dimensions and requiring calculation. Examples: speed calculated as distance \div time; and density calculated as mass \div volume.

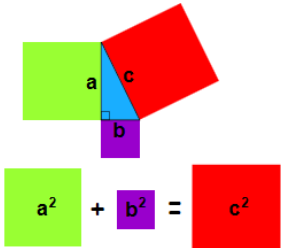
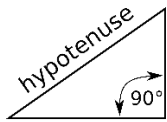


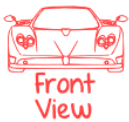
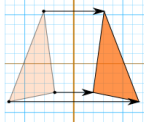
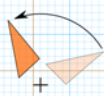
Maths 8.5 Topic 5


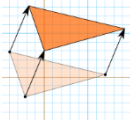
Term		Definition
1	Formula	A rule or fact written with mathematical symbols.
2	Substitute	Putting values where letters are.
3	Algebra	Letters are used to denote variables and unknowns.
4	Variable	A quantity that could take on a range of values (undefined value – expression).
5	Unknown	A quantity whose value is not known (defined value – equation)
6	Expression	a mathematical sentence containing numbers, operators & variables
7	Equation	An equation says that two things are equal and can be solved.
8	Coefficient	The constant quantity placed before and multiplying the variable in an expression.
9	Identity	An equation that is true no matter what values are chosen. Example: $\frac{a}{2} = a \times -0.5$ is true, no matter what value is chosen for "a".
10	Rearrange	Change the position of something
11	Rearrange formulae	To change the subject of the formula, and we do it by applying the core principle of: an equation remains unchanged as long as you do the same thing to both sides .
12	Faces	Each flat surface in a solid.
13	Surfaces	The outside layer of an object. It doesn't have to be flat.
14	Edges	Where two faces meet is called an edge.
15	Vertices	Posh word for a corner.
16	Pyramid	A 3D shape with a triangular or square base whose faces meet in a point at the top.
17	Prism	A 3D shape with a constant cross section
18	Cube	A box-shaped solid object that has six identical square faces
19	Cuboid	A box-shaped solid object. <ul style="list-style-type: none"> • It has six flat sides • All angles are right angles • All of its faces are rectangles
20	Triangular Prism	A prism with the cross section of a triangle
21	Cylinder	A solid object with: <ul style="list-style-type: none"> • two identical flat ends that are circular. • and one curved side. It has the same cross-section from one end to the other.
22	Cone	A 3D shape that has a circular base and the curved surface meets at a point.



23	Sphere	The mathematical word for a ball. All the points on a sphere are the same distance from the centre of the sphere.	
24	Area	<ul style="list-style-type: none"> - The size of a surface. - The amount of space inside the boundary of a flat (2-dimensional) object such as a triangle or circle, or surface of a solid (3-dimensional) object. 	
25	Volume	The amount of 3-dimensional space something takes up. Imagine how much water could be in it.	
26	Parallelogram	A flat shape with 4 straight sides where opposite sides are parallel.	
27	Trapezium	A quadrilateral with one pair of parallel sides.	
28	Parallel	Always the same distance apart and never touching.	
29	Perpendicular	At right angles (90°) to.	

Maths 8.6 Topic 6

Term		Definition
1	Area	<ul style="list-style-type: none"> - The size of a surface. - The amount of space inside the boundary of a flat (2-dimensional) object such as a triangle or circle, or surface of a solid (3-dimensional) object.
2	Volume	The amount of 3-dimensional space something takes up. Imagine how much water could be in it.
3	Prism	A 3D shape with a constant cross section
4	Pythagoras' Theorem	<p>In a right angled triangle the square of the long side is equal to the sum of the squares of the other two sides.</p> <p>It is stated in this formula: $a^2 + b^2 = c^2$</p> <p>The long side is called the hypotenuse.</p> 
5	Hypotenuse	<p>The side opposite the right angle in a right-angled triangle.</p> <p>It is also the longest side of the right-angled triangle.</p> 
6	Square	To multiply a number by itself.
7	Square root	<p>A square root of a number is a value that, when multiplied by itself, gives the number.</p> <p>The symbol is $\sqrt{\quad}$</p>
8	Scale	The ratio of the length in a drawing (or model) to the length on the real thing
9	Scale drawing	A drawing that shows a real object with accurate sizes reduced or enlarged by a certain amount (called the scale).
10	Plan	A drawing of something as viewed from above. 
11	Side elevation	What something looks like when viewed from the side. 
12	Front elevation	What something looks like when viewed from the front. 
13	Object	The original shape.
14	Image	Shape after the transformation.
15	Transformation	Changing a shape using TERRY: Translation, Enlargement, Reflection, Rotation, Yeah!
16	Reflection	An image or shape as it would be seen in a mirror. 
17	Rotation	A circular movement. Rotation has a central point that stays fixed and everything else moves around the point in a circle. 

18	Enlargement	Where the shape becomes bigger or smaller	
19	Translation	"Sliding": moving a shape without rotating or flipping it. - The shape still looks exactly the same, just in a different place.	
20	Congruent	When shapes are exactly the same size.	
21	Scale factor	This is the value of how much you have to multiply a shape to get from one shape to another. It can be positive, negative or even fractional.	
23	Vectors	For example, $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$ means 5 right, 2 down. The top number tells you how far right/left (right is positive/left is negative). The bottom numbers tells you how far up/down (up is positive/down is negative).	