

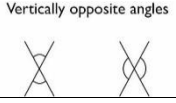
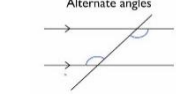
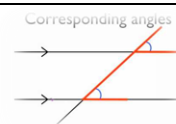


YEAR 9 HIGHER

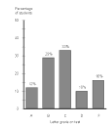
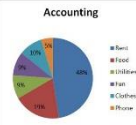

Knowledge Organisers

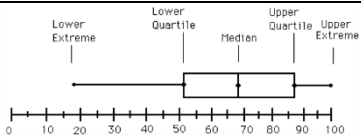
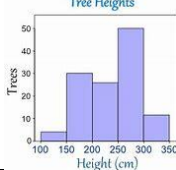
Year 9 Term 1

Term		Definition
1	Integer	A whole number. A positive number, a negative number or zero but not a fraction or a decimal.
2	Inequality	Solved inequalities is very similar to solving equations. Your answer will be an inequality. < ≤ or > ≥
3	Profit	Money you gain from selling something for more than you bought it for.
4	Loss	Money you lose from selling something for less than you bought it for.
5	Cost price	Cost price is the total amount of money that it costs a manufacturer to produce a given product or provide a given service.
6	Selling price	The term 'selling price' is defined as the price at which a good or service is sold by the seller to the buyer.
7	Debit	Money going out of your account.
8	Credit	Money coming into your account.
9	Balance	Balance is a state of equilibrium.
10	Income Tax	Income tax is a part of your income that you have to pay regularly to the government. There are three tax rates - 20%, 40% and 45%
11	VAT	"Value added tax" is a tax that is applied to many goods you buy. It is currently at 20%.
12	Interest Rate	1) Money a bank will give you as a reward for keeping your money with them, usually paid yearly. 2) Money a bank will charge you for borrowing money from them. E.g. When you take out a mortgage for a house, you will have to pay interest on the amount you borrow.
13	Estimation	This is when you roughly calculate the answer of something. In maths, you will need to round all numbers to 1 significant figure.
14	Factor	Numbers we can multiply together to get another number. E.g. Factors of 6: 1, 2, 3, 6.
15	Multiple	The result of multiplying a number by an integer (whole number). E.g. The multiples of 5: 5, 10, 15, 20, 25... The multiples of 3: 3, 6, 9, 12, 15, 18, 21...
16	Common factors	The result of multiplying a number by an integer (whole number). E.g. The multiples of 5: 5, 10, 15, 20, 25... The multiples of 3: 3, 6, 9, 12, 15, 18, 21...
17	Common multiples	Numbers that are common to both numbers involved. E.g. The multiples of 5: 5, 10, 15 , 20, 25... The multiples of 3: 3, 6, 9, 12, 15 , 18, 21... The common multiples are in the 3 and the 5 times tables such as 15.
18	Highest Common Factor (HCF)	The highest number that can be divided exactly into each of two or more numbers. E.g. 6 is the highest common factor of 12 and 18.
19	Lowest Common Multiple (LCM)	The lowest quantity that is a multiple of two or more numbers. 12 is the lowest common multiple of 3 and 4.
20	Product of prime factors	What are the prime numbers that can be multiplied together to give the original number. It is usually worked out using a prime factor tree. 60 = 2 x 2 x 3 x 5. Or in index form: 2 ² x 3 x 5
21	Product rule	
22	Prime number	A number that has only two factors-1 and itself. The first 15 prime numbers: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47.
23	Index form	Index form in maths means exponents or powers.
24	Point	An exact location. It has no size, only position.
25	Line	A line is a straight one-dimensional figure having no thickness and extending infinitely in both directions.
26	Vertices	Posh word for corner.
27	Edges	The border, outer limit of a shape.
28	Parallel lines	Lines that are always the same distance apart and never touch. For example, train tracks are parallel.
29	Perpendicular lines	Lines that are at right angles (90°) to each other.
30	Right angles	An angle of 90°
31	Polygons	A closed 2D shape with at least three straight sides and angles.

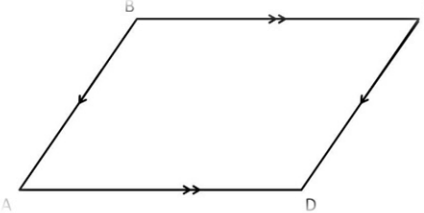
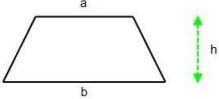
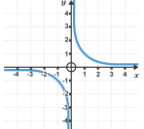
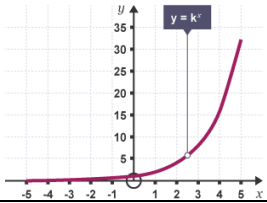
32	Regular polygons	A polygon is regular when all angles are equal and all sides are equal (otherwise it is "irregular").
33	Symmetry	Symmetry is when two or more parts are identical after a flip.
34	Rotational symmetry	In a full turn, how many times would the shape "land" on itself.
35	Angles at a point	Angles around a point is 360.
36	Angles on a straight line	Angles on a straight line is 180.
37	Vertically opposite angles	Vertically opposite angles are equal. 
38	Alternate angles	Alternate angles are equal. 
39	Corresponding angles	Corresponding angles are equal. 
40	Scale factors	The amount you multiply, or divide by, to get from one shape to another.
41	Bearings	A way of giving a direction. It has three components: 1) Always measured from North 2) Clockwise 3) Must be 3 Figures e.g. 030
42	Coefficient	A number before multiplying a variable or an unknown. For example, the coefficient of $3x$ is 3. The coefficient of $10xy^2$ is 10.
43	Powers	A small number to tell you how many times to multiply the number by itself. It is usually at the top right of the base number. E.g. $10^6 = 10 \times 10 \times 10 \times 10 \times 10 \times 10$ E.g. $2^5 = 2 \times 2 \times 2 \times 2 \times 2$
44	Roots	The root of a number X is another number, which when multiplied by itself a given number of times, equals x. For example, the square root of $100 = 10$. $\sqrt{100} = 10$. This is because $10 \times 10 = 100$. For example, the cube root of $8 = 2$. $\sqrt[3]{8} = 2$
45	Reciprocals	The reciprocal of a fraction is the fraction turned upside-down. For example, the reciprocal of $\frac{3}{7}$ is $\frac{7}{3}$ For example, the reciprocal of 2 is $\frac{1}{2}$
46	Equation	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. $x + 3 = 10$
47	Formula	A set of instructions for working something out. For example, $s = 4t + 3$ is a formula for S. It shows you how to find s assuming you know what t is.
48	Expression	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.
49	Identity	An equation that no matter what values are chosen, it will always be true. It is usually given with a triple equals sign (\equiv) For example, $x + x \equiv 2x$. This will always be true no matter what value of x you use. For example, $y \times y \equiv y^2$ will always be true no matter what value of y is chosen.
50	Term	A single number or variable.
51	Collecting like terms	A way of simplifying expressions by putting 'like terms' together.
52	Improper fraction	A fraction where numerator is bigger than the denominator.
53	Mixed number	A mix number is a whole number plus a fraction.

Year 9 Term 2






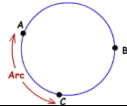

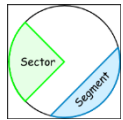
Term		Definition
1	Decimals	A number that is not a whole number.
2	Recurring decimal	A number in which a digit or group of digits is repeated indefinitely after the decimal point. E.g. $\frac{1}{9} = 0.11111111 \dots$
3	Terminating decimal	A number that contains a finite number of digits after the decimal point. E.g. $\frac{1}{2} = 0.5$
4	Co-ordinates	A system of coordinates that uses numbers to represent a point, line, or the like
5	Linear graphs	The word Linear simply means straight, so if you have a linear graph it is a straight line graphed by the equation $y=mx+b$ where m is the slope and b is the y -intercept (the point where the line crosses the y -axis).
6	Gradient	The Gradient (also called Slope) of a straight line shows how steep a straight line is. Gradient = $\frac{\text{change in } y}{\text{change in } x}$
7	Y-intercept	The y -intercept is the point in a function where a line or curve crosses the y -axis. In other words: the value of the x -coordinate is zero.
8	$Y = mx + c$	$y=mx+c$ is the standard form of the equation of a straight line, where ' m ' is the gradient of the line and ' c ' is the y -intercept.
9	Rounding to decimal places	To round to a decimal place: <ol style="list-style-type: none"> look at the digit after the decimal place you will round into if it's 5 or more, increase the previous digit by one if it's 4 or less, keep the previous digit the same
10	Rounding to significant figures	To round to a significant figure: Find the first non-zero digit you will round into look at the next digit if it's 5 or more, increase the previous digit by one if it's 4 or less, keep the previous digit the same fill any spaces to the right of the line with zeros, stopping at the decimal point if there is one.
11	Upper bound	The upper limit of what a number could be. E.g. I weight 80kg to the nearest 5kg. The upper bound would be 82.5kg
12	Lower bound	The lower limit of what a number could be. E.g. I weight 80kg to the nearest 5kg. The lower bound would be 77.5kg
13	Frequency table	A table to record the number of times (frequency) that an event has happened.
14	Bar charts	A way of representing data where the bars are represented by heights or lengths of lines or rectangles with equal width. 
15	Pie charts	A type of graph in which a circle is divided into sectors that represent a proportion of the whole. 
16	Pictograms	A way of illustrating data by using pictures, and parts of pictures to represent given numbers. 
17	Primary data	Data collected yourself. E.g. you design and complete a survey of students yourself.
18	Secondary data	Data collected from somewhere else that you did not collect. E.g. data from a Government census.
19	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.
20	Continuous data	Data that can take any value.

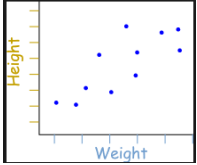
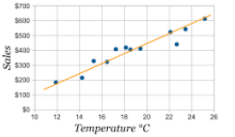
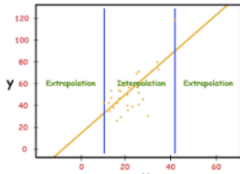
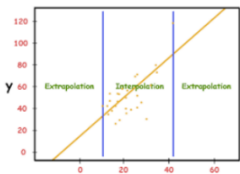

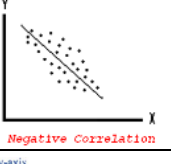
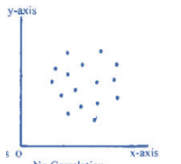
		E.g. temperature, time taken to run a race, height.
21	Boxplots	<p>Boxplot is a graphical representation of statistical measures like median, upper and lower quartiles, minimum and maximum data values.</p> 
22	Histograms	<p>In math, a histogram is a visual way to display frequency data using bars. A feature of histograms is that they show the frequency of continuous data.</p> 
23	Cumulative frequency	Cumulative frequency is the running total of the frequencies.
24	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, ..., ..., ...
25	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 = $5(100) + 7 = 507$
26	Square numbers	1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225. These form a square.
27	Prime numbers	A number that has only two factors. The first 15 prime numbers: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47.
28	Triangle numbers	1, 3, 6, 10, 15, 21, 28.... They form a triangle.
29	Cube numbers	1, 8, 27, 64, 135, 216... These numbers form a cube.
30	Fibonacci sequence	A sequence that is made by adding the previous two terms to give you the next term. 1, 1, 2, 3, 5, 8, 13, 21 ...
31	Quadratic sequence	The difference between each term increases, or decreases, at a constant rate. The second difference is constant. E.g. 2, 6, 12, 20, 30, 42 ...
32	Geometric Progressions	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)

Year 9 Term 3

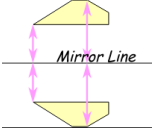
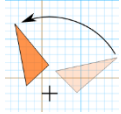
	Term	Definition
1	Percentage	A rate, number or amount out of 100.
2	Reverse percentages	When you are given a percentage that is not 100% and a value, and you need to work out the original value (100%). E.g. 40% = 24. So 10% = 6 So 100% = 60.
3	Percentage multiplier	A number you can multiply by to do percentage increase or decrease in one step. E.g. Increase by 7% = Multiply by 1.07 Decrease by 8% = Multiply by 0.92
4	Perimeter	Perimeter is the distance around a two-dimensional shape.
5	Area	The area of a shape is a measure of the two dimensional space that it covers.
6	Surface area	The total area of the surface of a three-dimensional object.
7	Triangle	A triangle is a polygon with three edges and three vertices There are four types of triangles: Isosceles triangle, equilateral triangle, right angle triangle, scalene triangle $A = \frac{1}{2} \times \text{base} \times \text{perpendicular height}$
8	Parallelogram	A Parallelogram is a flat shape with opposite sides parallel and equal in length. $A = \text{base} \times \text{perpendicular height}$ 
9	Trapezium	$A = \frac{1}{2} \times (a + b) \times \text{perpendicular height}$ Where a and b are the two parallel sides. 
10	Reciprocal graphs	A graph of the form $y = \frac{1}{x}$ is known as a reciprocal graph and once drawn, looks like this: 
11	Exponential graphs	Exponential graphs are graphs in the form $y = k^x$. These graphs increase rapidly in the y direction and will never fall below the x -axis. An exponential graph will look like this: 
12	Gradient	The Gradient (also called Slope) of a straight line shows how steep a straight line is. Gradient = $\frac{\text{change in } y}{\text{change in } x}$
13	Rate of change	A rate of change is a rate that describes how one quantity changes in relation to another quantity. If x is the independent variable and y is the dependent variable, then rate of rate of change = $\frac{\text{change in } y}{\text{change in } x}$

Year 9 Term 4

Term		Definition
1	Circumference	The perimeter of a circle. The length all around the outside of a circle. $C=2\pi r$
2	Area	$A=\pi r^2$
3	Centre	
4	Radius	
5	Tangent	A straight line that touches the edge of a circle once and once only. 
6	Diameter	A straight line that goes from side of a circle to the other, through the centre. 
7	Chord	A straight line that goes from one side of a circle to the other. 
8	Arc	An arc is a portion of the circumference of a circle. 
9	Sector	A "pizza slice" of a circle, from the centre. 
10	Segment	The region between a chord and the circumference. 
11	"in terms of pi"	It's when you leave the answer with pi in.
Ratio and Proportion		
12	Ratio	A ratio is a numerical comparison of 2 or more quantities which indicates their relative sizes. The ratio of boys to girls is 2:3 or 2 / 3.
13	Simplest form	A ratio in the simplest form is also called the ratio in the lowest terms, which means you can't simplify them any more.
14	Sharing in a ratio	
15	Ratios as fractions	$x:y = 3:5$. Therefore, $5x = 3y$. $x/y = 3/5$.
Algebra (Equations)		
16	Substitution	Replacing values where the letters are. E.g. $3x + 5$ Substitute $x = 4$ into the expression. $3(4) + 5 = 17$
17	Formulae	
18	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.
19	Solve equations with unknown on both sides	Take away the smaller "x" from both sides. E.g.

Term		Definition
Probability		
1	Frequency	The frequency is the number of times a specific value appears in a data set or list.
2	Frequency tree	A tree used to help work out the probability or likelihood of something happening. It is a way of illustrating information to make it easier to interpret.
3	Mutually exclusive	Mutually exclusive outcomes cannot happen at the same time. Flipping a coin has mutually exclusive outcomes, it can't be both heads and tails.
4	Probability	Probability is the likelihood of something happening in the future. It is expressed as a number between 0 (impossible) and 1 (certain).
5	Theoretical probability	What is the probability of it happening in theory. E.g. The theoretical probability of rolling a 3 on a dice is $\frac{1}{6}$
6	Experimental probability	What was the probability of it in real life when you actually did the experiment. This will differ from the theoretical probability initially but will get closer and closer with an increasing number of trials you do.
Statistics		
7	Scatter graph	A graph of plotted points that show the relationship between two sets of data. 
8	Bivariate data	Data involving two sets of related variables e.g. Height and Weight. It is often shown on a scatter graph.
9	Correlation	A relationship between two or more things.
10	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. 
11	Interpolation	This is when you use estimate a value from within your data set. It is a useful skill to have. 
12	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. 
13	Positive Correlation	A relationship where if one variable decreases, the other decreases. If one increases, the other increases. 
14	Negative Correlation	A relationship where if one variable increases, the other decreases and vice versa. 
15	No Correlation	Where there lies no relationship between two variables. The two variables have nothing to do with each other. 
Number (Standard form)		
16	Standard form	A way of writing really big and really small numbers. It is written in the form $a \times 10^n$ where $1 \leq A < 10$ E.g. 34,000,000 in standard form is 3.4×10^7

Year 9 Term 6

Term		Definition
Geometry		
1	Transformations	TERRY: Translations, Enlargements, Reflections, Rotations, Yeah!
2	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.
3	Translation	A transformation where a shape is just moved left/right and up/down. It is usually written as a column vector. For example, $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$ means 5 right, 2 down.
4	Enlargement	A transformation where one shapes has been enlarged by a given scale factor (can be larger or smaller). You also require a centre of enlargement.
5	Reflection	Each point in a shape appears the same distance on the opposite side of a line (the line of reflection). 
6	Rotation	A circular movement around a point. A full rotation is a turn of 360° . 
7	Vectors	A vector is an object that has both magnitude (how long it is) and direction.
8	Invariance	Is a quantity that remains constant
9	Construction	"Construction" in Geometry means to draw shapes, angles or lines accurately. These constructions use only compass, straightedge (i.e. ruler) and a pencil.
10	Loci	Plural of locus. A locus is a set of points satisfying a certain condition.
11	Perpendicular bisector	A perpendicular bisector of a line segment is a line that passes through the mid point of the line segment and is perpendicular to the line.
12	Angle bisector	In an angle bisector, it is a line passing through the vertex of the angle that cuts it into two equal smaller angles.
13	Net	A pattern that you can cut and fold to make a model of a solid shape.
14	Front elevation	The front elevation is the straight on view, from the front.
15	Side elevation	The side elevation is the view from the side.
16	Plan	The plan is the "birds eye view" or view from above looking down.