YEAR 10 FOUNDATION

Knowledge Organisers

Year 10 Foundation Term 1

	Term	Definition
1	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 x 10^7
2	Integer	A whole number. A positive number, a negative number or zero but not a fraction or a decimal.
3	Percentage change	$$Percentage\ Change = \frac{change}{original} \times 100$$
4	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
5	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.
6	Simple interest	Simple interest is where you calculate the first year of interest, and this is simply added on each year for a given number of years.
7	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
8	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
9	1cm	10mm
10	1m	100cm
11	1km	1000m
12	1kg	1000g
13	1 tonne	1000kg
14	1 litre	1000ml
15	1 litre	100cl
16	1ml	1cm^3
17	Speed	$$Speed = \frac{distance}{time}$$
18	Density	$$Density = \frac{mass}{volume}$$
19	Pressure	$$Pressure = \frac{force}{area}$$
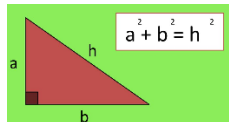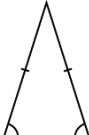
Year 10 Foundation Term 2
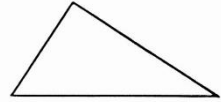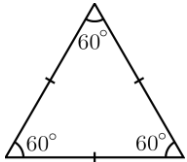
	Term	Definition
1	Median	The middle of an ordered set of values.
2	Mode	The most common value in a dataset
3	Mean	The average given when you add up all the values and divide by how many values there are.
4	Range	The difference between the largest and smallest data value.
5	Modal class	The group with the most common frequency.
6	Spread	The differences between the ranges of different datasets. If the range is large, the spread is large. If the range is small, the spread is small.
7	Outlier	A value that is much smaller or larger than most other values in the set of data.
8	Primary data	Data collected yourself. E.g. you design and complete a survey of students yourself.
9	Secondary data	Data collected from somewhere else that you did not collect. E.g. data from a Government census.
10	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.
11	Continuous data	Data that can take any value. E.g. temperature, time taken to run a race, height.
12	Interpolation	This is when you use estimate a value from within your data set. It is a useful skill to have.
13	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.
14	Sampling	A sample is a selection taken from a larger group.
15	Integer	A whole number. A positive number, a negative number or zero but not a fraction or a decimal.
16	Power	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 x 10 x 10 x 10 x 10 x 10 E.g. 2^5 = 2 x 2 x 2 x 2 x 2
17	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 x 10 = 100. For example, the cube root of 8 = 2. $\sqrt[3]{8} = 2$
18	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.
19	Square numbers	1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225. These form a square.
20	Cube numbers	1, 8, 27, 64, 135, 216… These numbers form a cube.
21	2^n	2,4,8,16,32,64,128,256…
22	3^n	3,9,27,81,243,729,2187…
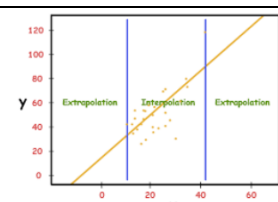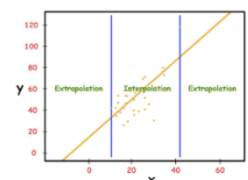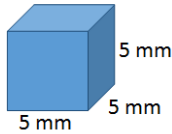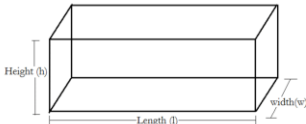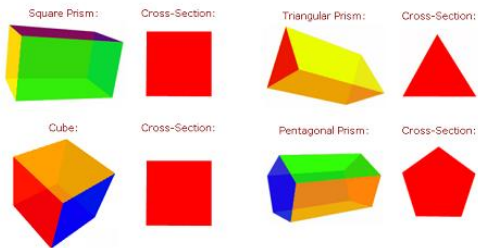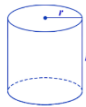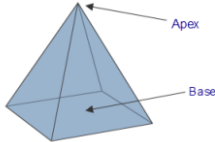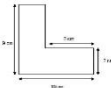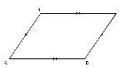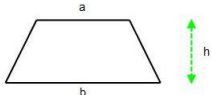
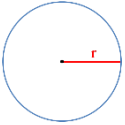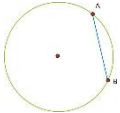| 23	4^n	4,16,64,256,1024,4096…
24	5^n	5,125,625,3125,15625…
25	Perpendicular bisector	
26	Bisect	Split exactly into two. Bisecting an angle:
27	Locus/Loci	A locus is a set of points which satisfy a particular condition.
28	Construction	This is where you use a compass and a ruler to draw geometrical figures.
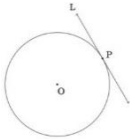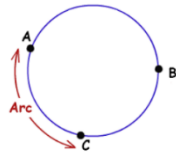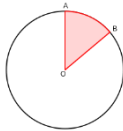
Year 10 Foundation Term 3

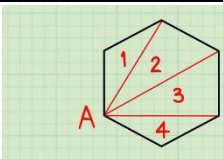|	Term	Definition
1	Formula	A set of instructions for working something out. For example, s = 4t + 3 is a formula for S. It shows you how to find s assuming you know what t is.
2	Equation	An equation is a mathematical statement that two things are equal in value. It consists of two expressions, one on each side on an equals sign. E.g. x + 3 = 10
3	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.
4	Expression	An algebraic expression involves letter that represent numbers. They do not have an equals sign. For example, a or 6b or x² + y² + z² are all expressions.
5	Term	A single number or variable.
6	Factor	Numbers we can multiply together to get another number. E.g. Factors of 6: 1, 2 , 3, 6.
7	Collecting like terms	Way of simplifying terms in expressions in which the variables are the same. E.g. 3x + 2y + 5x + 2x + 5y = 10x + 7y
8	Expanding a bracket	5(x + 2) = 5x + 10
9	Linear sequence	A number pattern which increases (or decreases) by the same amount each time. E.g. 5,7,9,11,13…

10	Solve equation with unknown on both sides	Take away the smaller "x" from both sides.
		 E.g.
		 7x + 2 = 3x + 10
		 (-3x) (-3x)
		 4x + 2 = 10
		   (-2) (-2)
		 4x = 8
		 (÷4) (÷4)
		       X = 2

11	Congruent triangles	SSS SAS ASA RHS
12	Congruent shape	Exactly the same shape and size
13	Similar shape	Two shapes where one is an enlargement of the other. Although the sides may be a different length, the angles will still remain the same.
14	Pythagoras' theorem	This is used when you have two sides of a right-angled triangle and you need to find out the third side. a² + b² = h²
15	Isosceles triangle	A triangle with two equal sides. The base angles are the same.
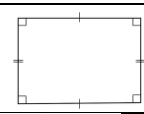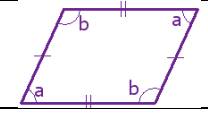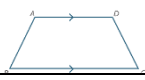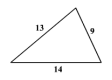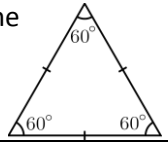
16	Scalene triangle	A triangle with three unequal sides. Scalene.
17	Equilateral triangle	An equilateral is a triangle in which all three sides are equal. Each angle is equal and 60^0 each.
18	Trigonometry	SohCahToa. When you have a right angled triangle and need to find a missing length or angle.
19	Hypotenuse	The longest side of a right-angled triangle. It is opposite the right angle.
20	Opposite	The side labelled "Opposite" is the side opposite the angle given to you.
21	Adjacent	The side labelled "Adjacent" should be labelled last and is the one that is left after labelling the Hypotenuse then the Opposite
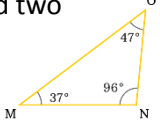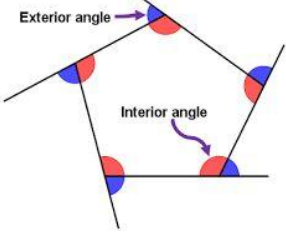
Year 10 Foundation Term 4

	Term	Definition
1	Perimeter	The length of the outline of a shape
2	Area	The amount of space taken up by a 2D shape.
3	Faces	A flat surface of a 3D shape.
4	Surfaces	A surface of a shape that doesn't need to be flat i.e. can be curved.
5	Edges	An edge is where two faces meet.
6	Vertices	A corner or a point where two lines meet. The plural of vertex is vertices.
7	Cube	3D shape with six equal squares as faces.
8	Cuboid	
9	Prism	A 3D shape with a constant cross-sectional area.
10	Cylinder	A 3D shape with a circular cross section.
11	Pyramid	A structure with a square or triangular base with sloping sides that meet at a point at the top. E.g. Pyramids in Egypt.
12	Cone	A 3D shape that has a circular base and the curved surface meets at a point.
13	Sphere	The mathematical word for a ball. All the points on a sphere are the same distance from the centre of the sphere.
14	Composite shape	A shape that can be split into more than one regular shape.
15	Surface area	The area taken up by a surface.
16	Area of a triangle	$A = \frac{1}{2} \times base \times perpendicular\ height$
17	Area of a parallelogram	$A = base \times perpendicular\ height$
18	Area of a trapezium	$A = \frac{1}{2} \times (a + b) \times perpendicular\ height$ Where a and b are the two parallel sides.
19	Co-ordinates	(x,y). "Along the corridor, up the stairs"
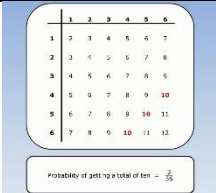
20	Y = mx + c	General equation of any straight line. The coefficient of x is the gradient and "c" is the y-intercept (where the straight line crosses the y axis). It must be in the form 1y = mx + c in order to calculate the gradient and y-intercept.
21	Gradient	A measure of how steep a line is. It is found by dividing y by x or (Rise divided by run).
22	Y-intercept	Where does the straight line cross the y axis.
23	Circle	A 2D shape where all points are the same distance from the centre.
24	Centre	
25	Radius	
26	Chord	A straight line that goes from one side of a circle to the other.
27	Diameter	A straight line that goes from side of a circle to the other, through the centre.
28	Circumference	The perimeter of a circle. The length all around the outside of a circle.
29	Tangent	A straight line that touches the edge of a circle once and once only.
30	Arc	An arc is a portion of the circumference of a circle.
31	Sector	A "pizza slice" of a circle, from the centre.
32	Area of a circle	$Area = \pi \times radius^2$
33	Circumference of a circle	$Circumference = \pi \times diameter$
34	"In terms of pi"	This is when you leave your answer in "exact form." E.g. $\pi \times 4^2 = 16\pi$ It is much better to leave it in this format as it will help at "A-Level" and gives the "exact" answer.

Year 10 Foundation Term 5

	Term	Definition
1	Simultaneous equations	Equations involving two or more unknowns that are to have the same values in each equation. (1) $3x + 4y = 24$ (1)×3 (2) $4x + 3y = 22$ (2)×4 $y = 12$
2	Variable	A letter or symbol used to represent any value. In maths, x and y are usually used as variables.
3	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.
4	Eliminate	This is when you try and remove a variable from a simultaneous equation. If you do 2x – 2x you will "eliminate the x's"
5	Substitute	This is when you replace a variable with a given, known quantity. E.g $3x + 4$ when $x = 10$. $3(10) + 4 = 34$
6	Angle sum of a triangle	Angles in a triangle sum to 180^0
7	Interior angle sum	The total sum of all the angles *inside* the polygon.
8	Formula for the interior angle sum of a polygon	$(n-2) \times 180$ is the formula to work out the interior angle sum of any polygon. It is based on the number of triangles you can fit within the polygon from a given point. $4 \times 180° = \boxed{720°}$
9	Quadrilateral	The name given to all 4-sided polygons.
10	Square	A quadrilateral with four equal sides and four right-angles.
11	Rectangle	A side with four straight sides, four right angles with two equal pairs of sides.
12	Parallelogram	A four sided quadrilateral with opposite sides being parallel. Opposite angles in a parallelogram are equal.
13	Trapezium	A quadrilateral with one set of parallel sides
14	Kite	A kite is a quadrilateral whose four sides can be grouped into two pairs of equal-length sides that are adjacent to each other.
15	Rhombus	A quadrilateral where all the sides are the same length. A rhombus is a parallelogram with four equal sides and opposite equal angles.
16	Triangle	A 2D shape with three straight sides and three angles.
17	Isosceles triangle	A triangle with two equal sides. The base angles of an isosceles triangle are equal.
18	Scalene triangle	A triangle that has three unequal sides.
19	Equilateral triangle	A triangle where all three sides are of an equal length. All the angles are equal too (60^0).
20	Right-angled triangle	A triangle with one right angle.

21	Acute-angled triangle	A triangle where all three angles are acute.	
22	Obtuse-angled triangle	A triangle where one angle is obtuse (greater than 90^0) and two acute angles.	
23	Pentagon	A polygon with five sides.	
24	Hexagon	A polygon with six sides	
25	Octagon	A polygon with 8 sides	
26	Decagon	A polygon with 10 sides	
27	Exterior angles of a regular polygon		

Year 10 Foundation Term 6

	Term	Definition
1	Reciprocal	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 $\frac{1}{2}$
2	Reciprocal graph	
3	Speed	$$Speed = \frac{distance}{time}$$
4	Distance	The length of space between two points.
5	Gradient	A measure of how steep a line is. It is found by dividing y by x or (Rise divided by run).
6	Probability	Probability is the likelihood of something happening in the future. It is expressed as a number between 0 (impossible) and 1 (certain).
7	Theoretical probability	What is the probability of it happening in theory. E.g. The theoretical probability of rolling a 3 on a dice is $\frac{1}{6}$
8	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.
9	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.
10	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.
11	Sample space diagram	The sample space of an experiment is the set of all possible outcomes of that experiment.
12	Randomness	Randomness is the lack of pattern or predictability in events.
13	Fairness	Fair is when all outcomes are equally likely.
14	Bias	A "built-in" error which makes all values wrong by a certain amount. A biased dice means that all the outcomes are not equally likely. Some values are more likely to appear than others (it is not fair).
15	Venn diagrams	A diagram representing data using circles, within a larger rectangle.