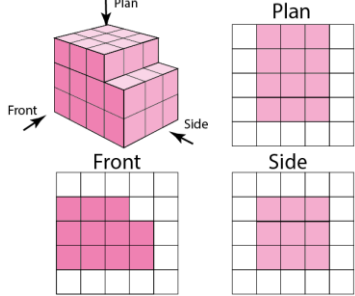
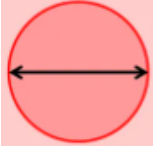
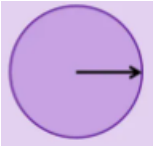
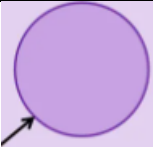
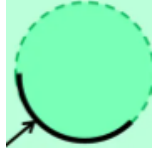
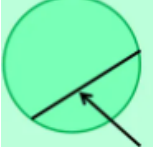
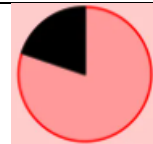




Plans and elevations

1.	Plan	The view from above a solid	
2.	Front elevation	The view from the front of a solid	
3.	Side elevation	The view from a side of the solid	

Circles - definitions and formulae

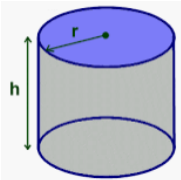
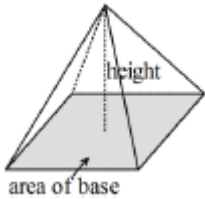
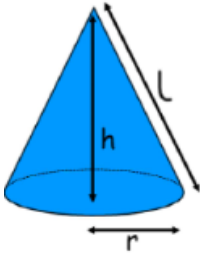
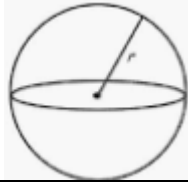
4.	Diameter	A straight line from edge to edge passing through the centre	
		Double the size of the radius	
5.	Radius	A straight line from the centre to the edge	
		Half the size of the diameter	
6.	Radii	The plural of radius	
7.	Circumference	Distance around the outside of the circle	
8.	Arc	Part of the circumference	
9.	Chord	A line within a circle where each end touches the edge	
10.	Sector	The region created by two radii and an arc	

11.	Segment	The region created by a chord and an arc	
12.	Tangent	A line outside the circle which only touches the circumference at one point	
13.	Semi -circle	Half a full circle	

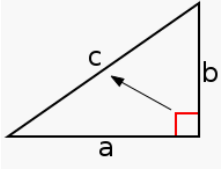
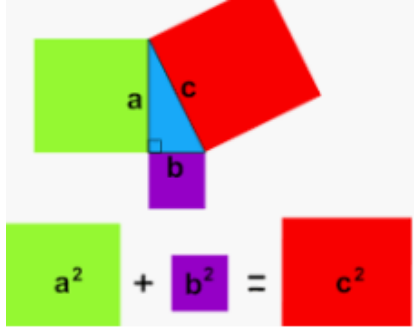
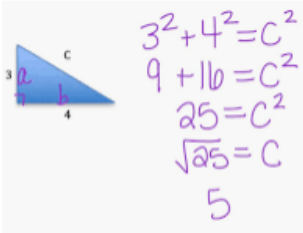
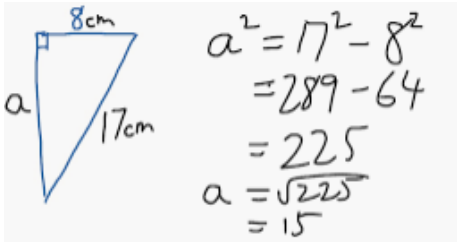
Area and circumference of circles formulae

14.	Pi (π)	Constant ratio linking the circumference and diameter of a circle	
		3.14159265...	
15.	Circumference of a circle	$C = \pi d$	Alternatively, using relationship between r and d $C = 2\pi r$

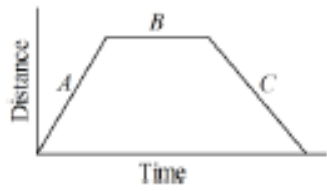
Cylinders, pyramids, cones and spheres

16.	Volume of a cylinder	$V = \pi r^2 h$	
17.	Surface area of a cylinder	$Total\ surface\ area = 2\pi r^2 + \pi dh$	
18.	Volume of a pyramid	$V = \frac{1}{3} \times area\ of\ base \times perpendicular\ height$	
19.	Volume of a cone	$V = \frac{1}{3} \times \pi r^2 h$	
20.	Surface area of a cone	$Curved\ surface\ area = \pi r l$	
		$Total\ surface\ area = \pi r^2 + \pi r l$	
21.	Volume of a sphere	$V = \frac{4}{3} \times \pi r^3$	

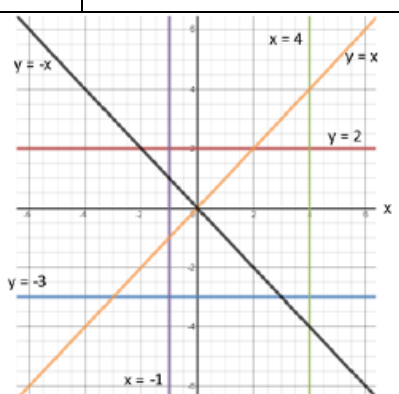
Pythagoras' Theorem

22.	Hypotenuse	The longest side of a right-angled triangle	
		It is always opposite the right angle	
23.	Right-angled triangle	A triangle that contains a right angle	
24.	Pythagoras' Theorem	$a^2 + b^2 = c^2$	
		Where c is the hypotenuse	
		Where a and b are the two shorter sides	
25.	To find the hypotenuse (c)		<ul style="list-style-type: none"> • Square • Add • Square root
26.	To find a short side (a/b)		<ul style="list-style-type: none"> • Square • Subtract • Square root
Real life graphs			
27.	Steady speed	Travelling the same distance each minute	
28.	Velocity	Speed in a particular direction	
29.	Rate of change	Shows how a variable changes over time	
30.	Acceleration	How fast velocity changes; measured in m/s ² or km/s ² etc	

Distance - Time graphs

31.	Represent a journey	 <p>A = steady speed, B = no movement, C = steady speed back to start</p>
32.	Vertical axis represents the distance from the starting point	
33.	Horizontal axis represents the time taken	
34.	Straight lines mean constant speed	
35.	Horizontal lines mean no movement	
36.	Gradient = speed	
37.	$\text{Average speed} = \frac{\text{total distance}}{\text{total time}}$	

Graphs and coordinates

1.	Axis	A reference line on a graph	
2.	Axes	Plural of axis	
3.	Quadrant	A quarter of a graph separated by a axes	
4.	Coordinate	Used to show a position on a coordinate plane, (x, y)	
		First coordinate is the horizontal position, (x axis) and the second is the vertical position (y axis)	
5.	Origin	The point $(0,0)$ on a set of axes	
6.	Plot	Mark a position or positions on a graph	
7.	y intercept	The y value where a graph crosses the y axis	where $x=0$
8.	x intercept	The x value where a graph crosses the x axis	where $y=0$
9.	"y=" graph	Constant y coordinate	
		Will be parallel to the x axis	
10.	"x=" graph	Constant x coordinate	
		Will be parallel to the y axis	

Transformations - definitions

11.	Transformation	Changing a 2D shape in some way.			
		Rotation	Reflection	Translation	Enlargement
12.	Object	The name given to a shape before a transformation has occurred.			
13.	Image	The name given to a shape after a transformation has occurred			
14.	Rotation	A circular movement about a fixed point			
15.	Centre of rotation	The fixed point that the shape has been rotated about			
		Written as a coordinate (x, y)			
16.	Direction	Clockwise or anticlockwise			
17.	Reflection	An image as it would be seen in a mirror			

18.	Line of reflection	The “mirror line” used to perform reflections.	
		Written using algebraic notation e.g. $y = 3$, $x = -2$, $y = x$ or x/y axis	
19.	Translation	The movement of a shape without rotating or flipping it	
20.	Column vector	Notation used to represent translations	$\begin{pmatrix} x \\ - \\ y \end{pmatrix}$
		x is the horizontal movement	
		y is the vertical movement	
21	Resultant vector	The vector that moves the shape to its final position after more than one translation	
22.	Enlargement	A change in size of a shape (can be bigger or smaller)	
23.	Scale factor	The proportions by which the dimensions of an object will increase/decrease by	
		If fractional then the image will be smaller than the object	
24.	Centre of enlargement	A fixed point to enlarge an object from	
		Written as a coordinate (x, y)	
25.	Single transformation	Where the object is only transformed once	
26.	Combination	Where the object is transformed multiple times	
27.	Origin	The point (0,0); where the x and y axis intersect	
28.	Similar	Same shape but different sizes	
		e.g. similar shapes are enlargements of one another	
29.	Congruent	Shapes that are the same shape and size	
30.	Describe	Use key words to accurately state what has happened to an object to make the resulting image	

Transformations

31.	Rotation	To carry out you need to:	To describe you need to write:
		<ol style="list-style-type: none"> 1. Draw object on tracing paper 2. Place pencil on ‘centre of rotation’ and carry out the motion 3. Draw your image on the grid 	<ol style="list-style-type: none"> a) “rotation” b) angle of rotation c) direction of rotation d) centre of rotation
32.	Reflection	To carry out you need to:	To describe you need to write:
		<ol style="list-style-type: none"> 1. If required draw the ‘line of reflection’ 2. Count squares from object to line and repeat the other side of the line for all corners of the object 	<ol style="list-style-type: none"> a) “reflection” b) the equation of the line of reflection

		3. Join points up to create the image	
33.	Translation	<p>To carry out you need to:</p> <ol style="list-style-type: none"> 1. Use vector notation to work out the horizontal and vertical movement 2. Count squares to carry out movement on all corners of the object 3. Join up points to create the image 	<p>To describe you need to write:</p> <ol style="list-style-type: none"> a) "translation" b) the column vector
34.	Enlargement	<p>To carry out you need to:</p> <ol style="list-style-type: none"> 1. If required cross the coordinate that is the centre of enlargement 2. For each corner count from the line of reflection to the object 3. Multiply this movement by the required scale factor 4. Draw new corners from the centre of enlargement with new horizontal and vertical movement 5. Join up points to create image 	<p>To describe you need to write:</p> <ol style="list-style-type: none"> a) "enlargement" b) the scale factor c) the centre of enlargement

Percentages

35.	Percentage	Means 'out of 100'	
36.	Multiplier	A decimal you multiply by to represent a percentage	
		To use a multiplier to find a percentage, divide your percentage by 100, then multiply the amount by this value.	
37.	Percentage increase	Calculate the percentage and add onto the original	
		Or use a multiplier	$amount \times \frac{100 + \% \text{ increase}}{100}$
38.	Percentage decrease	Calculate the percentage and subtract from the original	
		Or use a multiplier	$amount \times \frac{100 - \% \text{ increase}}{100}$
39.	Percentage change	$\frac{\text{Change}}{\text{Original}} \times 100$	

40.	Express one number as a percentage of another	$\frac{\text{Number 1}}{\text{Number 2}} \times 100$	
41.	Reverse percentage	Use when asked to find the original amount after a percentage increase or decrease.	
		$\text{Original Value} \times \text{Multiplier} = \text{New Value}$ $\text{Original Value} = \frac{\text{New Value}}{\text{Multiplier}}$	
42.	Interest	A fee paid for borrowing money or money earned through investing.	
43.	Simple interest	Interest that is calculated as a percentage of the original	$I = Prt$
			I – Interest P – Original amount r – interest rate t – time
44.	Compound interest	When interest is calculated on the original amount and any previous interest	$P \left(1 + \frac{R}{100} \right)^n$
		OR $\text{Original} \times \text{Multiplier}^{\text{time}}$	P – Original amount R – Interest rate n – the number of interest periods (e.g. yrs)
45.	Tax	A financial charge placed on sales or savings by the government e.g. VAT	
46.	Loss	Income minus all expenses, resulting in a negative value	
47.	Profit	Income minus all expenses, resulting in a positive value	
48.	Depreciation	A reduction in the value of a product over time	
49.	Annual	Means yearly	
50.	Per annum	Means per year	
51.	Salary	A fixed regular payment, often paid monthly	
FDP Conversions			
52.	Percentage to decimal	Divide by 100	
53.	Decimal to percentage	Multiply by 100	
54.	Fraction to percentage	Find an equivalent fraction with 100 as the denominator	
55.	Percentage to fraction	Write as a fraction over 100 then simplify	

56.	Fraction to decimal	Carry out division or convert to a percentage first
57.	Decimal to fraction	Use place value to find the denominator and simplify or convert to a percentage first

Basics to memorise

58.	Fraction	$\frac{1}{100}$	$\frac{1}{10}$	$\frac{1}{8}$	$\frac{1}{5}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{3}{4}$
	Decimal	0.01	0.1	0.125	0.2	0.25	0. $\dot{3}$	0.5	0. $\dot{6}$	0.75
	Percentage	1%	10%	12.5%	20%	25%	33. $\dot{3}$ %	50%	66. $\dot{7}$ %	75%

Terminating and recurring decimals

59.	Terminating decimal	Decimals that can be written exactly	e.g. 0.38
60.	Recurring decimal	Decimals where one digit or groups of digits are repeated	e.g. $0.\dot{7} = 0.7777\dots$ $0.\dot{8}5\dot{3} = 0.853853\dots$

61.	Converting a recurring decimal to a fraction	<ol style="list-style-type: none"> Let $x =$ recurring decimal. Let $n =$ the number of recurring digits. Multiply the recurring decimal by 10^n. Subtract (1) from (3) to eliminate the recurring part. Solve for x, expressing your answer as a fraction in its simplest form. 	
		<p>0.$\dot{7}$ (one recurring digit)</p> $x = 0.7777\dots$ $10x = 7.777\dots$ $10x - x = 7$ $9x = 7$ $x = \frac{7}{9}$	<p>1.2$\dot{5}\dot{6}$ (two recurring digits)</p> $x = 1.25656\dots$ $100x = 125.6565\dots$ $100x - x = 125.6565\dots - 1.256565\dots$ $99x = 124.4$ $x = \frac{124.4}{99} = \frac{1244}{990} = \frac{622}{495}$

62.	Converting a fraction to recurring decimals	Carry out the necessary division using a calculator or bus stop division	<p>e.g. $\frac{4}{7}$ means $4 \div 7$</p> $ \begin{array}{r} 0.57142857 \\ 7 \overline{) 4.00000000} \end{array} $
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