

## Year 9 : Cycle 1: Mathematics 100% sheet

Section 1: Properties of 3D Shapes		Section 2: Plans and elevations and parts of a circle	
<b>Surface</b>	The outside layer of an object, it has an area and can be flat or curved.	<b>Plan</b>	A 2D view of a 3D solid as viewed from above, a birds-eye view.
<b>Face</b>	Any of the individual flat surfaces of a solid object.	<b>Elevation</b>	The 2D view of a 3D solid from the front or the side.
<b>Edge</b>	For a 3D shape, the line segment where two faces meet.	<b>Net</b>	A pattern that you can cut and fold to make a model of a 3D shape.
<b>Vertex</b>	For a 3D shape, the point where two or more edges meet, a corner.	<b>Radius</b>	The distance from the centre of a circle to any point on the circumference.
<b>Perimeter</b>	The shortest distance round the outside of a 2D shape.	<b>Diameter</b>	The distance from one point on the circumference of a circle through the centre to another point on the circumference of a circle.
Section 3: Surface area		Section 4: Volume	
<b>Surface area</b>	The total area of all the surfaces on a 3D shape.	<b>Volume</b>	The amount of space a 3D shape takes up.
<b>Surface area method</b>	Find the area of each face separately, then add them together.	<b>Volume units</b>	mm <sup>3</sup> , cm <sup>3</sup> , m <sup>3</sup>
<b>Surface area of a sphere</b>	$SA = 4\pi r^2$	<b>Volume of a prism</b>	Volume = area of a cross-section x length
<b>Surface area of a cone</b>	Curved surface area = $\pi rl$ Circle base area = $\pi r^2$ Add these together.	<b>Volume of a triangular prism</b>	Volume = area of triangle x length of prism: $V = lbh^2$
<b>Surface area of cylinder</b>	$SA = 2\pi r^2 + 2\pi rh$	<b>Volume of a cube</b>	Volume = one side cubed: $V = l^3$
Section 5: Volume		Section 6: Volume	
<b>Volume of a cuboid</b>	Volume = area of rectangle x length of prism: $V = lbh$	<b>Volume of a cone</b>	Volume = $\frac{1}{3}$ x area of circle base x height of cone
<b>Volume of a cylinder</b>	Volume = area of circle x length of prism: $V = \pi r^2 h$	<b>Volume of a cone formula</b>	$V = \frac{\pi r^2 h}{3}$
<b>Volume of a pyramid</b>	Volume = $\frac{1}{3}$ x area of cross-section x length	<b>Volume of a sphere formula</b>	$V = \frac{4}{3}\pi r^3$
<b>Volume of a square based pyramid</b>	Volume = $\frac{1}{3}$ x area of square based x height of pyramid	<b>Density, mass, volume</b>	$Density = \frac{Mass}{Volume}$
<b>Volume of a square based pyramid formula</b>	$V = \frac{lwh}{3}$	<b>Capacity</b>	the maximum quantity a container can hold when full.

Section 7: Types of data		Section 8: Comparing statistical representation	
<b>Data</b>	A collection of information.	<b>Comparing median</b>	Compare median to say who is better/faster/taller.
<b>Continuous</b>	Numerical data that can be measured (e.g., height of a plant).	<b>Comparing ranges</b>	Compare ranges to say who is more consistent/less varied.
<b>Discrete</b>	Data which can only take certain values (e.g., eye colour).	<b>Correlation</b>	When there is a relationship between two sets of data, but we do not know if one caused the other.
<b>Grouped</b>	Numerical data that has been ordered and sorted into groups called classes.	<b>Positive correlation</b>	As one variable increases, the other increases.
<b>Data representation</b>	A table, chart, or graph which gives more meaning to a set of data (e.g., pie chart).	<b>Negative correlation</b>	as one variable increases, the other decreases.
Section 9: MMR		Section 10: MMR	
<b>Mean</b>	Add up all the values and divide by the total frequency.	<b>Mean from a table</b>	Method: multiply the variables by their frequencies (fx column), total the fx column, divide by total frequency.
<b>Mode</b>	The most frequent value or class.	<b>Mode from a table</b>	Find the cumulative frequency, then identify the position of the median and decide which class interval this falls into.
<b>Median</b>	Use half the total frequency to find the middle position, the locate the row this occurs in using the 'subtotal' column.	<b>Median from a table</b>	The one with the highest frequency.
<b>Range</b>	Difference between the largest and smallest values of the variable (first column).	<b>Range from a table</b>	Subtract the lowest variable from the first column from the highest variable from the first column.
Section 11: Displaying data		Section 12: Errors in statistical data	
<b>Stem and leaf</b>	A way of displaying a list of numbers. The stem goes down and the leaves go out to the right, has a key.	<b>Error in scales</b>	Frequency scales: too large, too small, has missing numbers, does not start at zero.
<b>Vertical line graph</b>	Like a bar chart, but the bars have no width, they are just straight lines up the page.	<b>Error in axes</b>	The axes are incorrectly labelled.
<b>Two-way table</b>	Shows information about two variables which do not overlap, the numbers represent frequencies.	<b>Error in data</b>	Data is missing or plotted incorrectly.
<b>Scatter graph</b>	A graph to show bivariate data.	<b>Error in bars</b>	Bar charts with varying width bars or varying space between them.
Section 13: Linear functions			
<b>Equations of a linear graph</b>	$y = mx + c$		
<b>Equation of a linear graph meaning</b>	m is the gradient. c is the y-intercept. x and y are the coordinates (x, y).		
<b>Gradient</b>	How steep a line is. The rate of change.		
<b>Formula to find the gradient</b>	$\frac{\text{change in } y}{\text{change in } x}$		
<b>y-intercept</b>	Where the line crosses the y-axis (0, a).		