

Level Descriptor	Algebra	Number	Geometry and Measures:	Data Handling and Probability	
Grade 9 (A**/approx)	<p>Solve quadratic inequalities</p> <p>Recognise and use geometric sequences where the common ratio is a surd</p> <p>Be able to calculate the area under a graph</p> <p>Recognise and use the equation of a circle centred at the origin and solve simultaneous equations involving the equation of a circle</p> <p>Locate turning points of quadratic functions by completing the square</p> <p>Calculate compound measures including pressure in numerical and algebraic contexts</p> <p>Recognise and use quadratic, cube and Fibonacci type sequences</p>	<p>Set up, solve and interpret growth and decay problems</p> <p>Express multiplicative relationships between two quantities as a ratio or fraction in algebraic form</p> <p>Write ratios as a linear function</p> <p>Use inequality notation to specify error intervals due to rounding</p>	<p>Apply the concepts of instantaneous and average rates of change</p> <p>By looking at gradients of tangents and chords to a curve</p> <p>Prove the circle theorems</p> <p>Find inverse and composite functions</p> <p>Locate turning points of quadratic functions</p> <p>Sketch $y = \tan x$</p> <p>Interpret area under graphs and gradients of graphs in real life contexts such as velocity-time graphs</p>	<p>Use the probability 'and' and 'or' rules</p>	
Grade 8 (A*/approx)	<p>To achieve grade 8, candidates will be able to:</p> <p>perform procedures accurately</p> <p>interpret and communicate complex information accurately</p> <p>make deductions and inferences and draw conclusions</p> <p>construct substantial chains of reasoning, including convincing arguments and formal proofs</p> <p>generate efficient strategies to solve complex mathematical and non-mathematical problems by translating them into a series of mathematical processes</p> <p>make and use connections, which may not be immediately obvious, between different parts of mathematics</p> <p>interpret results in the context of the given problem</p> <p>critically evaluate methods, arguments, results and the assumptions made</p>	<p>Simplify harder rational expressions</p> <p>Solve fractional linear equations with the unknown in the denominator such as $\frac{1}{x-2} = \frac{3}{2x-1}$</p> <p>Solve harder quadratic equations (a+1) such as $3x^2 - 2x + 3 = 0$</p> <p>By using the quadratic formula</p> <p>Simplify quadratic expressions by completing the square</p> <p>Solve quadratic equations by completing the square</p> <p>Find maximum and minimum values by completing the square</p> <p>Solve a pair of simultaneous equations involving one linear and one non-linear equation by substitution such as $y = x^2 - 3$ and $x^2 + y^2 = 5$</p> <p>Solve cubic equations by drawing appropriate lines on graphs</p> <p>Plot and sketch graphs of exponential functions</p> <p>Recognise the shapes of graphs of functions</p> <p>Transform the graphs of $y = f(x)$, such as linear, quadratic, cubic, sine and cosine functions using the transformations $y = f(x) + a$, $y = f(x)$ and $y = af(x)$</p> <p>Solve simultaneous equations graphically such as $x^2 + y^2 = 13$ and $y = 2x - 1$</p> <p>Derive harder algebraic proofs using reasoning and logic</p>	<p>Simplify surds such as $4(3 - \sqrt{2})$ and $(2 - \sqrt{3})(4 + \sqrt{3})$ in the form $a + b\sqrt{c}$</p> <p>Use index notation and index laws for fractional powers such as $1.6^{\frac{1}{2}}$</p> <p>Find the upper and lower bounds of more difficult calculations with quantities given to various degrees of accuracy</p>	<p>Use trigonometry to find sides and angles in three dimensions</p> <p>Find the angle between a line and a plane</p> <p>Understand the graphs of trigonometric functions for angles of any size</p> <p>Find the volume of the frustum of a truncated cone</p> <p>Solve more difficult vector geometry problems</p> <p>Solve more difficult vector geometry problems</p>	<p>Draw tree diagrams and use them to find probabilities of successive dependent events</p> <p>Use and interpret venn diagrams</p> <p>Consider outliers when calculating the range of a distribution</p> <p>Know that correlation does not imply causation</p>
Grade 7 (A approx)	<p>Factorise harder quadratic expressions</p> <p>Solve direct and inverse proportion problems</p> <p>Interpret the graphs of direct and inverse proportion relationships</p> <p>Rearrange formulae where the variable appears twice</p> <p>Explore the gradients of perpendicular straight line graphs</p> <p>Use the points of intersection of a quadratic graph such as $y = x^2 - 2x - 8$ and $y = 3x - 5$</p> <p>Solve quadratic equations (a-1) such as $x^2 - 2x - 8 = 0$ by using the quadratic formula</p> <p>Solve a pair of simultaneous equations where one is linear and one is non-linear such as $x + y = 7$ and $x^2 + y^2 = 9$</p> <p>Construct the graphs of loci including the circle $x^2 + y^2 = r^2$</p> <p>Solve simultaneous equations graphically such as $y = x - 1$ and $x^2 + y^2 = 9$</p>	<p>Rationalise the denominator of a surd such as $\frac{1}{\sqrt{2}}$</p> <p>Use index notation and index laws for simple fractional powers such as $1.6^{\frac{1}{2}}$</p> <p>Use index notation and index laws for simple negative powers such as 2^{-1}</p>	<p>Calculate the lengths of circular arcs</p> <p>Calculate the areas of sectors</p> <p>Calculate the surface areas of cylinders, cones and spheres</p> <p>Calculate the volume of cylinders, cones and spheres</p> <p>Prove the angle properties of a circle</p> <p>Prove the tangent/chord properties of a circle</p> <p>Use and prove the alternate segment theorem</p> <p>Enlarge a shape by a negative scale factor</p> <p>Compare areas and volumes of enlarged shapes</p> <p>Add, subtract and multiply vectors to solve vector geometry problems</p> <p>Understand the relationship between parallel and perpendicular vectors</p> <p>Find the area of a 2-D shape given the area of a similar shape and the ratio</p> <p>Find the volume of a 3-D solid given the volume of a similar solid and the ratio</p> <p>Prove that two triangles are congruent</p> <p>Prove the construction theorems</p> <p>Use Pythagoras' Theorem in 3-D problems</p> <p>Sketch and draw trigonometric graphs</p> <p>Use the sine rule to find the missing sides and missing angles of any triangle</p> <p>Use the cosine rule to find the missing sides and missing angles of any triangle</p> <p>Use the formula to find the area of a non-right angled triangle</p> <p>Use the conditions for congruent triangles in formal geometric proofs</p>	<p>Construct and interpret a histogram including unequal class intervals</p> <p>Use stratified sampling methods</p> <p>Understand dependent and independent outcomes</p> <p>Understand probabilities associated with mutually exclusive events</p> <p>Use tree diagrams to find probabilities of successive independent events</p>	
Grade 6 (B approx)	<p>Solve fractional linear equations such as $\frac{1}{x-2} = \frac{3}{2x-1}$</p> <p>Expand and simplify two expressions of the form $(a + b)^2$</p> <p>Factorise quadratic expressions</p> <p>Simplify rational expressions involving quadratic expressions</p> <p>Solve quadratic equations such as $x^2 - 2x - 8 = 0$</p> <p>By using the quadratic formula</p> <p>Rearrange formulae that include brackets, fractions and square roots</p> <p>Explore the gradients of parallel straight line graphs</p> <p>Solve more complex linear inequalities such as $x + 13 > 5x - 3$</p> <p>Solve a set of linear inequalities in 2 variables and represent the solution as a region of a graph</p> <p>Solve a pair of simultaneous equations including two unknowns such as $2x + y = 5$ and $2x + 2y = 4$</p> <p>Know that each equation can be represented by a line on a graph and that the point of the intersections of the lines is the solution</p> <p>Complete tables for, and draw graphs of cubic functions</p> <p>Use cubic graphs to solve equations</p> <p>Complete tables for, and draw graphs of reciprocal functions</p> <p>Use reciprocal graphs to solve equations</p>	<p>Find the lowest common multiple (LCM) of two or more numbers</p> <p>Find the highest common factor (HCF) of two or more numbers</p> <p>Round to a given number of significant figures</p> <p>Convert recurring decimals to fractions and fractions to recurring decimals</p> <p>Identify recurring and terminating decimals</p> <p>Convert between ordinary and standard index form representations</p> <p>Use standard index form with and without a calculator</p> <p>Work out reverse percentage problems</p> <p>Understand how to use successive percentages</p> <p>Work out compound interest</p> <p>Calculate proportional changes using a calculator</p>	<p>Use the angle properties of a circle</p> <p>Use the tangent/chord properties of a circle</p> <p>Distinguish between formulae for perimeter, area and volume by considering dimensions</p> <p>Find the upper and lower bounds of simple calculations (addition and subtraction)</p> <p>Involving quantities given to a particular degree of accuracy</p> <p>Interpret velocity-time graphs</p> <p>Discuss and interpret graphs modelling real situations</p> <p>Match sides and angles of similar triangles given some dimensions</p> <p>Find the distance between two points given their coordinates</p> <p>Use sine, cosine and tangent to calculate an angle in a right-angled triangle</p> <p>Use sine, cosine and tangent to calculate a side in a right-angled triangle</p>	<p>Construct a time-series graph and plot the moving average</p> <p>Use the trend line to estimate other values</p> <p>Construct and interpret a cumulative frequency diagram</p> <p>Use a cumulative frequency diagram to estimate the median and interquartile range</p> <p>Construct and interpret a box plot</p> <p>Compare two sets of a data using box plots</p> <p>Use relative frequency to find probabilities</p> <p>Complete a tree diagram</p>	
Grade 5 (B/C approx)	<p>To achieve grade 5, candidates will be able to:</p> <p>perform routine single- and multi-step procedures effectively by recalling, applying and interpreting notation, terminology, facts, definitions and formulae</p> <p>interpret and communicate information effectively</p> <p>make deductions, inferences and draw conclusions</p> <p>construct chains of reasoning, including arguments</p> <p>generate strategies to solve mathematical and non-mathematical problems by translating them into mathematical processes, realising connections between different parts of mathematics</p> <p>interpret results in the context of the given problem</p> <p>evaluate methods and results</p>	<p>Find a solution to a problem by forming an equation and solving it</p> <p>Form and solve equations such as $3x + 2 = 10$</p> <p>By using the quadratic formula</p> <p>Rearrange linear formulae such as $(x + 4)q = 7$</p> <p>Recognise the equations of straight line graphs such as $y = 3x - 5$</p> <p>Find the points of intersection of quadratic graphs with lines</p> <p>Use graphs to find the approximate solutions of quadratic equations</p> <p>Solve inequalities such as $3x + 9 > 12$ and $12 < 3x < 20$</p> <p>Solve linear inequalities such as $4x - 3 > 10$ and $4x - 2x > 7$</p> <p>Do calculations with mixed numbers</p> <p>Represent sets of solutions on the number line</p>	<p>Find the lowest common multiple (LCM) of two simple numbers</p> <p>Find the highest common factor (HCF) of two simple numbers</p> <p>Write a number as a product of its prime factors</p> <p>Find the reciprocal of a number</p> <p>Estimate answers to calculations</p> <p>Solve numerical problems involving multiplication and division with numbers of any size</p> <p>Using a calculator efficiently and appropriately</p> <p>Find minimum and maximum values</p> <p>Understand the effects of multiplying by numbers between 0 and 1</p> <p>Divide a number by a decimal such as $1 \div 0.2$ and $2.8 \div 0.07$</p> <p>Work out a percentage increase or decrease</p> <p>Express one quantity as a percentage of another</p> <p>Do calculations with mixed numbers</p> <p>Do calculations with simple fractions involving division</p> <p>Solve more complex ratio and proportion problems such as sharing out money between two groups</p> <p>Find the ratio of their numbers</p> <p>Solve ratio and proportion problems using the unitary method</p>	<p>Solve problems involving circles such as finding the perimeter of a semicircle</p> <p>Solve problems involving circles such as finding the area of a semicircle</p> <p>Calculate volumes of triangular prisms, parallelogram-based prisms and cylinders</p> <p>Solve problems involving surface areas of prisms and cylinders</p> <p>Convert between measures of area</p> <p>Convert between measures of volume</p> <p>Classify a quadrilateral by its geometric properties</p> <p>Solve problems using angle and symmetry properties of polygons and properties of intersecting and parallel lines</p> <p>Calculate interior and exterior angles of a regular polygon</p> <p>Find the midpoint of a line segment</p> <p>Use and understand coordinates in three dimensions</p> <p>Reflect shapes in the line $y = x$ and $y = -x$</p> <p>Rotate shapes about any point</p> <p>Describe fully reflections and rotations about any point</p> <p>Find the centre of rotation and describe it fully</p> <p>Combine reflections and rotations</p> <p>Translate a shape by a vector such as $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$</p> <p>Transform shapes by a combination of translation, rotation and reflection</p> <p>Compare the areas of an enlarged shape with the original shape</p> <p>Enlarge a shape by a positive whole number or fractional scale factor</p> <p>Solve more difficult speed problems</p> <p>Understand and use compound measures such as speed and density</p> <p>Recognise accuracy in measurements given to the nearest whole unit</p> <p>Calculate complex average speeds from distance-time graphs</p> <p>Construct the perpendicular bisector of a line</p> <p>Construct the perpendicular from a point to a line</p> <p>Construct the perpendicular from a point on a line</p> <p>Construct angles of 60° and 90°</p> <p>Construct the bisector of an angle</p> <p>Match one side and one angle of congruent triangles given some dimensions</p> <p>Use Pythagoras' theorem to find the hypotenuse of a right-angled triangle</p> <p>Use Pythagoras' theorem to find any side of a right-angled triangle</p> <p>Use Pythagoras' theorem to find the height of an isosceles triangle</p> <p>Use Pythagoras' in practical problems</p> <p>Construct accurately loci, such as those equidistant from two fixed points</p> <p>Solve loci problems, such as identifying points less than 3cm from point P</p>	<p>Find the mean for grouped data</p> <p>Find the median class for grouped data</p> <p>Find the modal class for grouped data</p> <p>Use measures of average and range to compare distributions and make inferences</p> <p>Draw a line of best fit on a scatter graph by inspection</p> <p>Identify possible sources of bias in the design and use of data collection sheets and questionnaires</p> <p>Specify hypotheses and test them</p> <p>Understand relative frequency as an estimate of probability</p> <p>Use relative frequency to compare outcomes of experiments</p>
Grade 4 (B/C approx)	<p>Multiply out expressions with brackets such as $5(3x - 2)$</p>	<p>Estimate answers to calculations involving division</p>	<p>Find the area of a triangle, parallelogram, kite and trapezium</p>	<p>Calculate the mean for a frequency distribution</p>	

		<p>Factorise expressions</p> <p>Write the terms of a sequence or series of diagrams given the nth term</p> <p>Draw lines such as $y = 2x + 3$</p> <p>Solve problems involving straight lines</p> <p>Solve linear equations with unknowns on each side such as $3x - 4 = 5 + x$</p> <p>Solve linear equations with brackets such as $2(5x + 1) = 28$</p> <p>Substitute numbers into more complicated formulae such as $s = at^2$</p> <p>Solve problems involving graphs, such as finding where the line $y = x + 5$ crosses the line $y = 1$</p> <p>Draw graphs of simple quadratic functions such as $y = 2x^2$ and $y = x^2 + 2$</p>	<p>Use the terms square, positive and negative square root, cube and cube root</p> <p>Recall integer squares from 2×2 to 15×15 and the corresponding square roots</p> <p>Recall the cubes of 2, 3, 4, 5 and 10</p> <p>Multiply two decimals such as 2.4×0.7</p> <p>Convert decimals to fractions and fractions to decimals</p> <p>Do calculations with simple fractions involving subtraction</p> <p>Increase or decrease a quantity by a given percentage</p>	<p>Find the area and perimeter of compound shapes</p> <p>Calculate the area of a circle to an appropriate degree of accuracy</p> <p>Calculate the circumference of a circle to an appropriate degree of accuracy</p> <p>Reflect shapes in lines such as $x = 2$ or $y = -1$</p> <p>Rotate shapes around the origin</p> <p>Identify reflective symmetry in 3-D solids</p> <p>Translate a shape using a description such as 4 units right and 3 units down</p> <p>Enlarge a shape by a positive scale factor from a given centre</p> <p>Calculate simple average speeds from distance-time graphs</p> <p>Draw a quadrilateral such as a kite or a parallelogram with given measurements</p> <p>Understand that the lengths of two sides and a non-included angle do not define a unique triangle</p> <p>Construct and recognise the nets of 3-D solids such as pyramids and triangular prisms</p> <p>Draw plans and elevations of 3-D solids</p> <p>Understand the idea of a locus</p>	<p>Construct a stem and leaf diagram (ordered)</p> <p>Construct a frequency diagram</p> <p>Interpret a time-series graph</p> <p>Draw a scatter graph by plotting points on a graph</p> <p>Interpret a scatter graph</p> <p>Classify and know the difference between various types of a data</p> <p>Design and use data collection sheets and questionnaires</p> <p>Use a variety of different sampling methods</p> <p>Use a two-way table to find a probability</p> <p>Understand mutually exclusive events</p> <p>Use the fact that the probabilities of mutually exclusive events add up to 1</p>
Grade 3 (D approx)		<p>Find a particular term in a sequence involving negative or fractional numbers</p> <p>Write the term-to-term rule in a sequence involving negative or fractional numbers</p> <p>Simplify expressions with more than one variable such as $2a + 5b + a - 2b$</p> <p>Draw lines such as $x = 3$ and $y = x + 2$</p> <p>Solve equations such as $5x + 4x - 2 = 22$</p> <p>Read from a conversion graph for negative values</p> <p>Interpret distance – time graphs</p> <p>Write an expression from a problem</p> <p>Substitute negative numbers into a simple formula</p> <p>Use formulae from Mathematics and other subjects</p> <p>Plot the graphs of straight lines such as $x = 3$ and $y = 4$</p> <p>Complete a table of values for equations such as $y = 3x + 3$ and draw the graph</p>	<p>Round a number to one significant figure</p> <p>Multiply and divide negative integers</p> <p>Add and subtract decimals</p> <p>Find one number as a fraction of another</p> <p>Do calculations with simple fractions involving addition</p> <p>Do calculations with simple fractions involving multiplication</p> <p>Calculate cubes and cube roots (with and without the use of a calculator)</p> <p>Use function keys on a calculator for powers and roots</p> <p>Compare fractions, decimals and percentages</p>	<p>Show that angles of a triangle add up to 180° and use this to find angles</p> <p>Show that the exterior angle of a triangle is equal to the sum of the interior opposite angles</p> <p>Use angle properties of equilateral, isosceles and right-angled triangles</p> <p>Find the area and perimeter of compound shapes</p> <p>Calculate interior and exterior angles of a quadrilateral</p> <p>Investigate tessellations</p> <p>Find the volume of a cube or cuboid</p> <p>Find the height of a cuboid given volume, length and breadth</p> <p>Reflect shapes in the axes of a graph</p> <p>Enlarge a shape by a positive scale factor</p> <p>Find the measurements of the dimensions of an enlarged shape</p> <p>Use map scales to find distance</p> <p>Solve simple speed problems</p>	<p>Compare the mean and range of two distributions</p> <p>Calculate the \bar{x} column for a frequency distribution</p> <p>Construct a pie chart</p> <p>Interpret a stem and leaf diagram</p> <p>Design and use two-way tables for discrete and grouped data</p> <p>Understand the difference between experimental and theoretical probabilities</p> <p>Understand and use relative frequency</p>
Grade 2 (E approx)	Grade 2	<p>Find a particular term in a sequence involving positive numbers</p> <p>Write the term-to-term rule in a sequence involving positive numbers</p> <p>Describe number patterns and relationships including multiply, factor and square</p> <p>Simplify expressions with one variable such as $a + 2a + 3a$</p> <p>Use coordinates in all four quadrants</p> <p>Plot points of a conversion graph and read off positive values</p> <p>Use a simple formula such as $P = 2w + 2h$</p> <p>Substitute positive numbers into a simple formula</p> <p>Solve equations such as $4x = 24$ and $x - 3 = 7$</p>	<p>Add and subtract negative integers</p> <p>Round numbers to given powers of 10 and to a given number of decimal places</p> <p>Write down the place value of a digit, for example, what is the value of 4 in 0.24</p> <p>Order decimals, for example which is bigger, 0.24 or 0.3</p> <p>Multiply any three digit number by any two digit numbers without a calculator</p> <p>Divide any three digit number by any two digit number without a calculator</p> <p>Multiply whole numbers and decimals by 10, 100 and 1000</p> <p>Divide whole numbers and decimals by 10, 100 and 1000</p> <p>Add decimals to two places</p> <p>Subtract decimals to two places</p> <p>Multiply decimals to two places</p> <p>Divide decimals to two places</p> <p>Simplify fractions such as $\frac{15}{25}$</p> <p>Arrange fractions in order of size</p> <p>Work out fractions of quantities such as $\frac{1}{2}$ of 20</p> <p>Estimate square roots</p> <p>Calculate squares and square roots (with and without the use of a calculator)</p> <p>Understand that percentage means "out of one hundred"</p> <p>Change a percentage to a fraction or a decimal and vice versa</p> <p>Work out a percentage of a given quantity</p> <p>Solve simple ratio and direct proportion problems</p>	<p>Draw a triangle given three sides, or two angles and a side, or two sides and the included angle</p> <p>Draw a cuboid on an isometric grid and mark its dimensions</p> <p>Express fractions of full turns in degrees and vice versa</p> <p>Recognise obtuse, acute and reflex angles</p> <p>Estimate angles</p> <p>Measure and draw angles accurately to the nearest degree</p> <p>Understand the terms "perpendicular lines" and "parallel lines"</p> <p>Know angles on a straight line add up to 180°</p> <p>Know angles around a point add up to 360°</p> <p>Know angles in a triangle add up to 180°</p> <p>Work out the perimeter of a simple rectangle</p> <p>Work out the area of a simple rectangle</p> <p>Draw all the lines of symmetry on a 2D shape</p> <p>Give the order of rotational symmetry of a 2-D shape</p> <p>Name draw or complete 2-D shapes from information about their symmetry</p> <p>Draw the line of reflection for two shapes</p> <p>Give a scale factor of an enlarged shape</p> <p>Convert one metric unit to another</p> <p>Convert between metric and imperial units</p> <p>Make sensible estimates of a range of measures in everyday settings</p> <p>Draw the net of a simple solid such as a cuboid</p>	<p>Work out the range for a set of numbers</p> <p>Calculate the mean for a set of numbers</p> <p>Find the median for an even set of numbers</p> <p>Write down the mode from a graph</p> <p>Compare two distributions using the range and one of the mode, median or mean</p> <p>Interpret a pie chart</p> <p>Understand and use a probability scale</p> <p>Express a probability as a fraction</p> <p>Display outcomes systematically</p>
Grade 1 (F approx)		<p>Continue a sequence of numbers or diagrams</p> <p>Write down terms of a simple sequence</p> <p>Use coordinates in the first quadrant, such as plot the point (3,2)</p> <p>Use a formula written in words such as cost = 20 x distance travelled in miles</p>	<p>Understand positive and negative integers</p> <p>Round to the nearest integer</p> <p>Write an integer correct to the nearest 10 or the nearest 100</p> <p>Find the factors of a number</p> <p>Estimate answers to problems involving decimals</p> <p>Find equivalent fractions</p>	<p>Identify isosceles, equilateral and right-angled triangles</p> <p>Use the word "congruent" when triangles are identical</p> <p>Find the perimeter of a shape by counting sides of squares</p> <p>Find the area of a square by counting squares</p> <p>Estimate the area of an irregular shape by counting squares and part squares</p> <p>Name the parts of a circle</p> <p>Recognise and name shapes such as isosceles triangle, parallelogram, rhombus, trapezium and hexagon</p> <p>Draw the reflection of a shape in a mirror line</p> <p>Draw a line of symmetry on a 2-D shape</p> <p>Decide which metric unit to use for everyday measurements</p> <p>Measure a line accurately to the nearest millimetre</p> <p>Recognise the net of a simple solid such as a cuboid</p> <p>Find the volume of a solid by counting cubes and stating units</p> <p>Recognise and name three dimensional solids</p> <p>Sketch three dimensional solids</p>	<p>Find the mode for a set of numbers</p> <p>Find the median for an odd set of numbers</p> <p>Construct and interpret a pictogram</p> <p>Interpret a pictogram</p> <p>Construct and interpret a bar chart</p> <p>Design and use tally charts for discrete data</p> <p>Design and use tally charts for grouped data</p> <p>Understand and use the vocabulary of probability</p>