

Mastering Mathematics Progression Strands

Mapped to the GCSE Subject content for first teaching September 2015

Year 7

Year 11

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Calculating	N1.1 Adding & subtracting whole numbers <ul style="list-style-type: none">Apply addition & subtraction, including formal written methods, to positive integers	N1.2 Multiplying whole numbers <ul style="list-style-type: none">Apply multiplication, including formal written methods, to positive integers	N1.3 Adding & subtracting decimals <ul style="list-style-type: none">Apply addition & subtraction, including formal written methods, to positive decimals	N1.4 Dividing whole numbers <ul style="list-style-type: none">Apply division, including formal written methods, to positive integers	N1.5 Adding & subtracting negative numbers <ul style="list-style-type: none">Apply addition & subtraction, including formal written methods, to positive & negative integers	N1.6 Multiplying & dividing negative numbers <ul style="list-style-type: none">Apply multiplication & division, including formal written methods, to positive & negative integers	N1.7 BIDMAS <ul style="list-style-type: none">Use conventional notation for priority of operations, including brackets, powers, roots & reciprocals	N1.8 Multiplying decimals <ul style="list-style-type: none">Apply multiplication, including formal written methods, to decimals	N1.9 Dividing decimals <ul style="list-style-type: none">Apply division, including formal written methods, to decimals					
Using Our Number System	N2.1 Working with whole numbers <ul style="list-style-type: none">Order positive integersUse the symbols $>$, $<$, $=$Understand & use place value	N2.2 Understanding Decimals <ul style="list-style-type: none">Order positive & negative decimalsUnderstand & use place value. Work interchangeably with terminating decimals & their corresponding fractions	N2.3 Multiplying & dividing decimals by 10, 100 etc <ul style="list-style-type: none">Understand & use place value	N2.4 Understanding negative numbers <ul style="list-style-type: none">Order positive & negative integers	N2.5 Using the number system effectively <ul style="list-style-type: none">Understand & use place value when calculating with decimals (divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation & the unique factorisation theorem	N2.6 Understanding Standard Form <ul style="list-style-type: none">Interpret standard form $A \times 10^n$, where $1 \leq A < 10$, n is an integer	N2.7 Calculate with standard form <ul style="list-style-type: none">Calculate with & interpret standard form	N2.8 Recurring decimals <ul style="list-style-type: none">Change recurring decimals into their corresponding fractions & vice versa						
Accuracy	N3.1 Rounding to the nearest 10 or 100 <ul style="list-style-type: none">Round numbers & measures to an appropriate degree of accuracy	N3.2 Rounding larger numbers <ul style="list-style-type: none">Round numbers & measures to an appropriate degree of accuracy	N3.3 Rounding decimals to the nearest integer <ul style="list-style-type: none">Round numbers & measures to an appropriate degree of accuracy	N3.4 Rounding to 2 decimal places <ul style="list-style-type: none">Round numbers & measures to an appropriate degree of accuracy	N3.5 Significance <ul style="list-style-type: none">Round numbers & measures to an appropriate degree of accuracy	N3.6 Approximating <ul style="list-style-type: none">Estimate answersCheck calculations using approximation & estimation, including answers obtained using technology	N3.7 Limits of accuracy <ul style="list-style-type: none">Use inequality notation to specify simple error intervals due to truncation or roundingApply & interpret limits of accuracy	N3.8 Upper & lower bounds <ul style="list-style-type: none">Apply & interpret limits of accuracy, including upper & lower bounds						
Fractions	N4.1 Understanding Fractions <ul style="list-style-type: none">Express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1	N4.2 Finding equivalent fractions <ul style="list-style-type: none">Order positive & negative fractions, use the symbols $>$, $<$, $=$	N4.3 Multiplying Fractions <ul style="list-style-type: none">Apply multiplication, including formal written methods, to simple fractions	N4.4 Adding & subtracting fractions <ul style="list-style-type: none">Apply addition & subtraction, including formal written methods, to simple fractions	N4.5 Working with mixed numbers <ul style="list-style-type: none">Apply addition, subtraction & multiplication, including formal written methods, to simple fractions (proper & improper), & mixed numbers	N4.6 Dividing Fractions <ul style="list-style-type: none">Apply division, including formal written methods, to simple fractions (proper & improper), & mixed numbers								
Percentages	N5.1 Understanding & using percentages <ul style="list-style-type: none">Define percentage as number of parts per hundredExpress one quantity as a percentage of anotherCompare two quantities using percentages	N5.2 Calculating percentages of quantities <ul style="list-style-type: none">Interpret percentages as operators	N5.3 Convert fractions & decimals to & from percentages <ul style="list-style-type: none">Order decimals & fractionsWork interchangeably with terminating decimals & their corresponding fractionsInterpret percentages as percentage changes as a fraction of a decimal, & interpret these multiplicatively	N5.4 Applying percentage increases & decreases to amounts <ul style="list-style-type: none">Work with percentages greater than 100%Solve problems involving percentage change, including percentage increase/decrease & simple interest including financial mathematics	N5.5 Find % change from one amount to another <ul style="list-style-type: none">Solve problems involving percentage change	N5.6 Reverse percentages <ul style="list-style-type: none">Solve problems involving percentage change, including original value problems	N5.7 Repeated percentage increase/decrease <ul style="list-style-type: none">Interpret percentages & percentage changes as a fraction of a decimal, & interpret these multiplicativelySet up, solve & interpret the answers in growth & decay problems, including compound interest	N5.8 Growth & decay <ul style="list-style-type: none">Set up, solve & interpret the answers in growth & decay problems, including compound interestWork with general iterative processes						
Ratio & Proportion	N6.1 Understanding Ratio Notation <ul style="list-style-type: none">Use ratio notation, including reduction to simplest formRelate ratios to fractions	N6.2 Sharing in a given ratio <ul style="list-style-type: none">Divide a given quantity into two parts in a given part to part whole ratioExpress the division of a quantity into two parts as a ratioApply ratio to real contexts & problems (such as involving conversion, comparison, scaling mixing, concentrations)Relate ratios to fractions	N6.3 Working with proportional quantities <ul style="list-style-type: none">Understand & use proportion as equality of ratiosSolve problems involving direct proportionUse compound units such as rates of pay & unit pricing	N6.4 The constant of proportionality <ul style="list-style-type: none">Relate ratios to linear functionsSolve problems involving direct proportion, including graphical & algebraic representationsInterpret equations that describe direct proportion	N6.5 Working with Inversely proportional quantities <ul style="list-style-type: none">Solve problems involving direct & inverse proportion, including graphical & algebraic representationsUnderstand that Y is inversely proportional to X is equivalent to X is proportional to $1/Y$Interpret equations that describe direct & inverse proportion	N6.6 Formulating equations to solve proportion problems <ul style="list-style-type: none">Solve problems involving direct & inverse proportion, including graphical & algebraic representationsConstruct & interpret equations that describe direct & inverse proportion								
Number properties	N7.1 Multiples <ul style="list-style-type: none">Use the concepts & vocabulary of multiples	N7.2 Factors, Primes & Powers <ul style="list-style-type: none">Use the concepts & vocabulary of prime numbers & factors (divisors)Use positive integer powers & associated real roots	N7.3 Divisibility tests <ul style="list-style-type: none">Recognise & use relationships between operationsUse the concepts & vocabulary of prime numbers, factors (divisors) & multiples	N7.4 Index notation <ul style="list-style-type: none">Use positive integer powers & associated real roots (square, cube & higher), recognise powers of 2, 3, 4, 5Calculate with positive integer indices	N7.5 Prime Factorisation <ul style="list-style-type: none">Use the concepts & vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation & the unique factorisation theorem	N7.6 Indices <ul style="list-style-type: none">Calculate with roots, & with integer indices	N7.7 Fractional Indices <ul style="list-style-type: none">Calculate with roots, & with integer & fractional indicesEstimate powers & roots of any given positive number	N7.8 Surds <ul style="list-style-type: none">Calculate exactly with surdsSimplify surd expressions involving squares (e.g. $\sqrt{12} = \sqrt{4 \times 3} = 2\sqrt{3}$) & rationalise denominators						
Starting Algebra	A1.1 Making & using word formulae <ul style="list-style-type: none">Substitute numerical values into formulaeUnderstand & use the concept of a formula	A1.2 Using letters <ul style="list-style-type: none">Substitute numerical values into formulaeUnderstand & use the concept of a formula	A1.3 Combining variables <ul style="list-style-type: none">Use & interpret algebraic manipulation including:<ul style="list-style-type: none">in place of $a \times b$, $3y$ in place of $y + y + y$ & $3 \times y$, 2^2 in place of $a \times a$, ab in place of $a \times b$Substitute numerical values into expressionsUnderstand & use the concepts & vocabulary of expressions & termsSimplify & manipulate algebraic expressions by collecting like terms, simplifying expressions involving sums, products & powers	A1.4 Working with formulae <ul style="list-style-type: none">Recognise & use relationships between operations, including inverse operationsUnderstand & use standard mathematical formulae, rearrange formulae to change the subjectSubstitute numerical values into formulae, including scientific formulae	A1.5 Setting up & solving simple equations <ul style="list-style-type: none">Use & interpret algebraic manipulation including:<ul style="list-style-type: none">in place of $a \times b$, $3y$ in place of $y + y + y$ & $3 \times y$, 2^2 in place of $a \times a$, ab in place of $a \times b$Coefficients written as fractions rather than decimalsUnderstand & use the concepts & vocabulary of expressions, equations & termsSimplify & manipulate algebraic expressions by collecting like terms, simplifying expressions involving sums, products & powersSolve linear equations in one unknown algebraically	A1.6 Using brackets <ul style="list-style-type: none">Use & interpret algebraic manipulation including bracketsUnderstand & use the concepts & vocabulary of expressions, equations, terms & factorsSimplify & manipulate algebraic expressions by multiplying a single term over a bracket, taking out common factors	A1.7 Working with more complex equations <ul style="list-style-type: none">Solve linear equations in one unknown algebraically (including those with the unknown on both sides of the equation)Derive an equation, solve the equation, & interpret the solution	A1.8 Solving equations with brackets <ul style="list-style-type: none">Simplify & manipulate algebraic expressions by multiplying a single term over a bracketSolve linear equations in one unknown algebraically (including those with the unknown on both sides of the equation)Derive an equation, solve the equation, & interpret the solution	A1.9 Simplifying harder expressions <ul style="list-style-type: none">Simplify & manipulate algebraic expressions by expanding, products of two binomials	A1.10 Using complex formulae <ul style="list-style-type: none">Recognise & use relationships between operations, including inverse operationsUnderstand & use standard mathematical formulae, rearrange formulae to change the subjectSubstitute numerical values into formulae, including scientific formulae	A1.11 Identifies <ul style="list-style-type: none">Understand & use the concepts & vocabulary of expressions, equations, formulae & identitiesKnow the difference between an equation & an identity, argue mathematically to show algebraic expressions are equivalent & use algebra to support & construct arguments	A1.12 Using Indices in Algebra <ul style="list-style-type: none">Simplify & manipulate algebraic expressions, including the laws of indicesSimplify & manipulate algebraic fractions, including surdsFactorise quadratic expressions of the form $ax^2 + bx + c$	A1.13 Manipulating more expressions & formulae <ul style="list-style-type: none">Understand & use standard mathematical formulae; rearrange formulae to change the subjectSubstitute numerical values into formulae, including scientific formulae, or procedures into algebraic expressions or formulaeSimplify & manipulate algebraic fractions, including surds	A1.14 Rearranging more formulae <ul style="list-style-type: none">Understand & use standard mathematical formulae; rearrange formulae to change the subjectSubstitute numerical values into formulae, including scientific formulae, or procedures into algebraic expressions or formulaeSimplify & manipulate algebraic fractions, including surds
Sequences	A2.1 What is a sequence? <ul style="list-style-type: none">Generate terms of a sequence from a term-to-term rule	A2.2 Defining sequences <ul style="list-style-type: none">Generate terms of a sequence from a term-to-term rule or a position-to-term rule	A2.3 Linear sequences <ul style="list-style-type: none">Recognise & use sequences of simple arithmetic progressionsGenerate terms of a sequence from a term-to-term rule or a position-to-term ruleDeduce expressions to calculate the nth term of linear sequences	A2.4 Special sequences <ul style="list-style-type: none">Recognise & use sequences of triangular, square & cube numbers & Fibonacci type sequencesGenerate terms of a sequence from a term-to-term rule or a position-to-term rule	A2.5 Quadratic Sequences <ul style="list-style-type: none">Recognise & use quadratic sequences	A2.6 Geometric progressions <ul style="list-style-type: none">Recognise & use simple geometric progressions (r^2 where n is an integer, & r is a rational number $\neq 0$)	A2.7 Other sequences <ul style="list-style-type: none">Recognise & use simple geometric progressions (r^2 where n is an integer, & r is a rational number $\neq 0$ or a surd) or other sequences	A2.8 nth term of quadratic sequences <ul style="list-style-type: none">Deduce expressions to calculate the nth term of quadratic sequences						
Functions and Graphs	A3.1 Real life graphs <ul style="list-style-type: none">Plot & interpret graphs of non-standard functions in real contexts to find approximate solutions to problems such as simple kinematic problems involving distance, speed & acceleration	A3.2 Plotting graphs of linear functions <ul style="list-style-type: none">Work with coordinates in all four quadrantsPlot graphs of equations that correspond to straight-line graphs in the coordinate planeIdentify & interpret gradients & intercepts of linear functions graphically & algebraicallyRecognise, sketch & interpret graphs of linear functions	A3.3 The equation of a straight line <ul style="list-style-type: none">Recognise, sketch & interpret graphs of quadratics, cubics & simple cubic functionsIdentify & interpret gradients & intercepts of linear functions graphically & algebraicallyRecognise, sketch & interpret graphs of linear functions	A3.4 Plotting quadratic & cubic graphs <ul style="list-style-type: none">Recognise, sketch & interpret graphs of quadratics, cubics & simple cubic functionsIdentify & interpret gradients & intercepts of linear functions graphically & algebraicallyRecognise, sketch & interpret graphs of linear functions	A3.5 Finding equations of lines <ul style="list-style-type: none">Plot graphs of equations that correspond to straight-line graphs in the coordinate plane, use the form $y = mx + c$ to identify, parallel linesFind the equation of the line through two given points or through one point with a given gradient	A3.6 Quadratic functions <ul style="list-style-type: none">Identify & interpret roots, intercepts, turning points of quadratic functions, graphically, deduce roots algebraically	A3.7 Polynomial & Reciprocal functions <ul style="list-style-type: none">Recognise, sketch & interpret graphs of quadratic functions, simple cubic, functions & the reciprocal functionPlot & interpret graphs including reciprocal graphs & graphs of non-standard functions in real contexts to find approximate solutions to problems such as simple kinematic problems involving distance, speed & acceleration	A3.8 Perpendicular lines <ul style="list-style-type: none">Use the form $y = mx + c$ to identify parallel & perpendicular lines	A3.9 Inverse & composite functions <ul style="list-style-type: none">Where appropriate, interpret simple expressions as functions with inputs & outputs; interpret the reverse process as the 'inverse function'; interpret the succession of two functions as a 'composite function' (the use of formal function notation is expected)	A3.10 Exponential functions <ul style="list-style-type: none">Recognise, sketch & interpret graphs of exponential functions $y = k^x$ for positive values of k	A3.11 Trigonometrical functions <ul style="list-style-type: none">Recognise, sketch & interpret graphs of the trigonometric functions (in degrees) $y = \sin x$, $y = \cos x$ & $y = \tan x$ for angles of any size	A3.12 Circular functions <ul style="list-style-type: none">Recognise & sketch & interpret graphs of the trigonometric functions (in degrees) $y = \sin x$, $y = \cos x$ & $y = \tan x$ for angles of any size		
Algebraic methods	A4.1 Trial & improvement <ul style="list-style-type: none">This unit has been included as a precursor to iteration because the technique of trial & improvement is often used in problem solving where, for example, a reasonable answer might result in an equation that does not have an analytical solution that is accessible to students	A4.2 Linear inequalities <ul style="list-style-type: none">Understand & use the concepts & vocabulary of inequalitiesUse the typical symbols $>$, $<$, \geq, \leqSolve linear inequalities in one variable; represent the solution set on a number line	A4.3 Solve pairs of equations by substitution <ul style="list-style-type: none">Solve two simultaneous equations in two variables (linear/linear)Derive two simultaneous equations, solve the equations & interpret the solution	A4.4 Solve simultaneous equations using elimination <ul style="list-style-type: none">Solve two simultaneous equations in two variables (linear/linear)Derive two simultaneous equations, solve the equations & interpret the solution	A4.5 Using graphs to solve simultaneous equations <ul style="list-style-type: none">Find approximate solutions to two simultaneous equations, using a graphDerive two simultaneous equations, solve the equations & interpret the solution	A4.6 Solving linear inequalities in two variables <ul style="list-style-type: none">Solve linear inequalities in two variables using set notation & on a graph	A4.7 Solving equations numerically <ul style="list-style-type: none">Find approximate solutions to equations numerically using iteration	A4.8 Proving general results <ul style="list-style-type: none">Use algebra to support & construct proofs						
Working with Quadratics	A5.1 Factorising quadratics <ul style="list-style-type: none">Understand & use the concepts & vocabulary of factorsFactorise quadratic expressions of the form $x^2 + bx + c$, including the difference of two squares	A5.2 Solve equations by factorising <ul style="list-style-type: none">Solve quadratic equations algebraically by factorising	A5.3 Completing the square <ul style="list-style-type: none">Solve quadratic equations by completing the squareDeduce turning points by completing the square	A5.4 The quadratic formula <ul style="list-style-type: none">Solve quadratic equations by using the quadratic formula	A5.5 Simultaneous equations with quadratics <ul style="list-style-type: none">Solve two simultaneous equations in two variables (linear/quadratic) algebraically; find approximate solutions using a graphDerive two simultaneous equations, solve the equations & interpret the solution	A5.6 Solving quadratic inequalities <ul style="list-style-type: none">Solve quadratic inequalities in one variable; represent the solution set on a number line using set notation								
Properties of non-linear graphs	A6.1 Using chords & tangents <ul style="list-style-type: none">Calculate or estimate gradients of graphs (including quadratic & other non-linear graphs) & interpret results in cases such as distance-time & velocity-time graphs (this does not include calculus)	A6.2 Translations & reflections of functions <ul style="list-style-type: none">Sketch translations & reflections of a given function	A6.3 Area under non-linear graphs <ul style="list-style-type: none">Calculate or estimate areas under graphs (including quadratic & other non-linear graphs) & interpret results in cases such as velocity-time graphs (this does not include calculus)											
Units & scales	GM1.1 Length, GM1.2 Mass, GM1.3 Time <ul style="list-style-type: none">Use standard units of measure & related concepts using decimal quantities where appropriateChange freely between related standard units in numerical contexts	GM1.4 Volume <ul style="list-style-type: none">Use standard units of measure of volume & capacity & related concepts using decimal quantities where appropriateChange freely between related standard units in numerical contexts	GM1.5 Interpreting Scales <ul style="list-style-type: none">Use standard units of measure & related concepts using decimal quantities where appropriateChange freely between related standard units in numerical contexts	GM1.6 The metric system <ul style="list-style-type: none">Use standard units of measure & related concepts using decimal quantities where appropriateChange freely between related standard units in numerical contexts	GM1.7 Metric-imperial conversions <ul style="list-style-type: none">Use standard units of measure & related concepts using decimal quantities where appropriateChange freely between related standard units in numerical contexts	GM1.8 Bearings <ul style="list-style-type: none">Use scale diagrams to map & scale drawings & scale drawings & scale drawingsMeasure line segments & angles in geometric figures	GM1.9 Scale drawing <ul style="list-style-type: none">Use scale factors, scale drawings & mapsUse ratio notationInterpret maps & scale drawings & scale drawingsMeasure line segments & angles in geometric figures	GM1.10 Compound units <ul style="list-style-type: none">Use standard compound measuresUse & change freely between compound units (e.g. speed, rates of pay, area)	GM1.11 Working with compound units <ul style="list-style-type: none">Use & change freely between compound units (e.g. density & pressure)					
Properties of Shapes	GM2.1 Common shapes <ul style="list-style-type: none">Use conventional terms & notations: vertices, edges, parallel lines, perpendicular lines, right angles, polygons, regular polygons, use standard conventions for sides & angles of triangles; draw diagrams from written descriptionDerive & apply the properties & definitions of special quadrilaterals, including square, rectangle, parallelogram, & triangles & other plane figures using appropriate languageIdentify, describe congruent shapesIdentify circle definitions & properties, including centre, radius, diameter & circumference	GM2.2 Line symmetry <ul style="list-style-type: none">Use conventional terms & notations for polygons with reflection symmetriesDerive & apply the properties & definitions of special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite & rhombus, & triangles & other plane figures using appropriate language	GM2.3 Angle facts <ul style="list-style-type: none">Apply the properties of angles at a point, on a straight line, vertically opposite anglesMeasure line segments & angles in geometric figures	GM2.4 Rotational symmetry <ul style="list-style-type: none">Use conventional terms & notations for polygons with rotational symmetriesDerive & apply the properties & definitions of special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite & rhombus, & triangles & other plane figures using appropriate language	GM2.5 Angles in triangles & quadrilaterals <ul style="list-style-type: none">Derive & use the sum of angles in a triangle to deduce & use the angle sum in a quadrilateralDerive & apply the properties & definitions of special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite & rhombus, & triangles using appropriate language	GM2.6 Types of quadrilateral <ul style="list-style-type: none">Derive & apply the properties & definitions of special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite & rhombus using appropriate language	GM2.7 Angles & Parallel lines <ul style="list-style-type: none">Use alternate & corresponding angles on parallel lines	GM2.8 Angles in a polygon <ul style="list-style-type: none">Use the sum of angles in a triangle to deduce & use the angle sum in any polygon, to derive properties of regular polygons	GM2.9 Congruent triangles & proof <ul style="list-style-type: none">Use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS)Apply angle facts, triangle congruence, similarity & properties of quadrilaterals to construct & derive results about angles & sides including the fact that the base angles of an isosceles triangle are equal, & use known results to obtain simple proofs	GM2.10 Proof using similar & congruent triangles <ul style="list-style-type: none">Use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS)Apply angle facts, triangle congruence, similarity & properties of quadrilaterals to construct & derive results about angles & sides including the fact that the base angles of an isosceles triangle are equal, & use known results to obtain simple proofs	GM2.11 Circle Theorems <ul style="list-style-type: none">Identify & apply circle definitions & properties, including: tangent, arc, sector & segmentApply & prove the standard circle theorems concerning angles, radii, tangents & chords, & use them to prove related results			
Measuring shapes	GM3.1 Understanding area <ul style="list-style-type: none">Use standard units of measure for area & related concepts	GM3.2 Finding Area & perimeter <ul style="list-style-type: none">Use standard units of measure for length & area & related conceptsKnow & apply formulae to calculate: area of triangles, parallelograms, trapeziaCalculate perimeters of 2D shapes	GM3.3 Circumference <ul style="list-style-type: none">Identify & apply circle definitions & properties, including: centre, radii & circumferenceKnow the formulae: circumference of a circle = $2\pi r$ or πdCalculate perimeters of 2D shapes, including circles	GM3.4 Area of circles <ul style="list-style-type: none">Know the formulae: area of a circle = πr^2Calculate areas of circles & composite shapes	GM3.5 Pythagoras' Theorem <ul style="list-style-type: none">Know the formulae for Pythagoras' theorem: $a^2 + b^2 = c^2$; apply it to find lengths in right-angled triangles in two dimensional figures	GM3.6 Arcs & sectors <ul style="list-style-type: none">Calculate exactly with multiples of πIdentify & apply circle definitions & properties, including: tangent, arc, sector, & segmentCalculate arc lengths, angles & areas of sectors of circles	GM3.7 The cosine rule <ul style="list-style-type: none">Know & apply the cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$ to find unknown lengths & angles	GM3.8 The sine rule <ul style="list-style-type: none">Know & apply the sine rule $a/\sin A = b/\sin B = c/\sin C$ to find unknown lengths & anglesKnow & apply Area = $\frac{1}{2}ab \sin C$ to calculate the area, sides or angles of any triangle						
Construction	GM4.1 Angles in degrees <ul style="list-style-type: none">Measure line segments & angles in geometric figures	GM4.2 Constructions with a ruler & protractor <ul style="list-style-type: none">Measure line segments & angles in geometric figuresIdentify & construct congruent shapes	GM4.3 Constructions with a pair of compasses <ul style="list-style-type: none">Use the standard ruler & compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from a given point, bisecting a given angle) to draw the construction given figures & solve loc problems, know that the perpendicular distance from a point to a line is the shortest distance to the line	GM4.4 Loc <ul style="list-style-type: none">Use the standard ruler & compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from a given point, bisecting a given angle) to draw the construction given figures & solve loc problems, know that the perpendicular distance from a point to a line is the shortest distance to the line										
Transformations	GM5.1 Position & Cartesian coordinates <ul style="list-style-type: none">Solve geometric problems on coordinate axesUse conventional terms & notations: points, lines	GM5.2 Cartesian coordinates in four quadrants <ul style="list-style-type: none">Solve geometric problems on coordinate axesUse conventional terms & notations: points, lines	GM5.3 Translation <ul style="list-style-type: none">Identify, describe & construct congruent & similar shapes, including on coordinate axes by considering translationDescribe translations as 2D vectors	GM5.4 Reflection <ul style="list-style-type: none">Identify, describe & construct congruent & similar shapes, including on coordinate axes by considering reflection & translation	GM5.5 Rotation <ul style="list-style-type: none">Identify, describe & construct congruent & similar shapes, including on coordinate axes by considering rotation, reflection & translationUse scale factorsCompare lengths & areasMake links to similarity & scale factors	GM5.6 Enlargement <ul style="list-style-type: none">Identify, describe & construct congruent & similar shapes, including on coordinate axes by considering rotation, reflection, translation & enlargement (including fractional scale factors)Use scale factorsMake links to similarity & scale factorsApply the concepts of congruence & similarity, including the relationships between lengths in similar figures	GM5.7 Similarity <ul style="list-style-type: none">Identify, describe & construct congruent & similar shapes, including on coordinate axes by considering rotation, reflection, translation & enlargementUse scale factorsMake links to similarity & scale factorsApply the concepts of congruence & similarity, including the relationships between lengths in similar figures	GM5.8 Trigonometry <ul style="list-style-type: none">Know the formulae for the trigonometric ratios, \sin, \cos, & \tan, apply them to find angles & lengths in right-angled triangles in two dimensional figuresCompare lengths & areas using ratio notation; make links to similarity (including trigonometrical ratios)	GM5.9 Trig for special angles <ul style="list-style-type: none">Know the exact values of \sin & \cos for $0^\circ, 30^\circ, 45^\circ, 60^\circ, 90^\circ$Know the exact value of \tan for $0^\circ, 30^\circ, 45^\circ, 90^\circ$	GM5.10 Finding centres of rotation <ul style="list-style-type: none">Identify, describe & construct congruent & similar shapes, including on coordinate axes by considering rotation, reflection, translation & enlargement	GM5.11 Enlargement with Negative scale factors <ul style="list-style-type: none">Identify, describe & construct congruent & similar shapes, including on coordinate axes by considering rotation, reflection, translation & enlargement (including fractional & negative scale factors)	GM5.12 Combining transformations <ul style="list-style-type: none">Describe the changes & invariance achieved by combinations of rotation, reflection, translation & enlargement (including fractional & negative scale factors)	GM5.13 Trig in 2D & 3D <ul style="list-style-type: none">Know the formulae for Pythagoras' theorem & the trigonometric ratios, \sin, \cos, & \tan, apply them to find angles & lengths in right-angled triangles, and, where possible, general triangles in 2D & three dimensional figuresKnow & apply the sine rule & cosine rule to find unknown lengths & angles	
Three-dimensional shapes	GM6.1 Properties of 3-D shapes <ul style="list-style-type: none">Identify properties of the faces, surfaces, edges & vertices of cubes, cuboids, prisms, cylinders, pyramids, cones & spheresUse conventional terms & notations: vertices, edges, planes	GM6.2 Understanding nets <ul style="list-style-type: none">Identify properties of the faces, surfaces, edges & vertices of cubes, cuboids, prisms, cylinders, pyramids, cones & spheresUse conventional terms & notations: vertices, edges, planes	GM6.3 Volume & surface area of cuboids <ul style="list-style-type: none">Use standard units of measure & related concepts (length, area, volume)Know & apply formulae to calculate volumes of cuboids	GM6.4 2-D representations of 3-D shapes <ul style="list-style-type: none">Interpret plans & elevations of 3D shapes	GM6.5 Prisms <ul style="list-style-type: none">Use standard units of measure & related concepts (length, area, volume)Know & apply formulae to calculate volumes of cuboids and other right prisms (including cylinders)	GM6.6 Enlargement to 2 & 3 dimensions <ul style="list-style-type: none">Compare lengths, areas & volumes using ratio notation; make links to scale factors	GM6.7 Constructing plans & elevations <ul style="list-style-type: none">Construct & interpret plans & elevations of 3D shapes	GM6.8 Surface area & volume of 3D shapes <ul style="list-style-type: none">Calculate surface area & volume of spheres, pyramids, cones & composite solidsCalculate exactly with multiples of π	GM6.9 Area & volume in similar shapes <ul style="list-style-type: none">Apply the concepts of similarity, including the relationships between lengths, areas & volumes in similar figures					
Vectors	GM7.1 Vectors <ul style="list-style-type: none">Apply addition & subtraction of vectors, multiplication of vectors by a scalar, & diagrammatic & column representations of vectors	GM7.2 Proof with vectors <ul style="list-style-type: none">Use vectors to construct geometric arguments & proofs												
Statistical Measures	SP1.1 Mode, Median & Range <ul style="list-style-type: none">Interpret, analyse & compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mode) & spread (range)	SP1.2 Using Mean, Median, Mode & Range <ul style="list-style-type: none">Interpret, analyse & compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean, mode) & spread (range)	SP1.3 Using Frequency Tables <ul style="list-style-type: none">Interpret, analyse & compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean, mode) & spread (range)	SP1.4 Using Grouped Frequency Distributions <ul style="list-style-type: none">Interpret, analyse & compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean, mode) & spread (range)	SP1.5 Inter-quartile range <ul style="list-style-type: none">Interpret, analyse & compare the distributions of data sets from univariate empirical distributions through box plots & appropriate measures of central tendency (median, mean, mode) & spread (range, quartiles & inter-quartile range)Construct & interpret cumulative frequency graphs, & know their appropriate use									
Statistical diagrams	SP2.1 Using tables & charts <ul style="list-style-type: none">Interpret & construct tables, charts & diagrams, including frequency tables, bar charts & pictograms for categorical dataInterpret, analyse & compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete data	SP2.2 Stem & Leaf diagrams <ul style="list-style-type: none">Interpret, analyse & compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete data	SP2.3 Vertical line charts <ul style="list-style-type: none">Interpret & construct vertical line charts for ungrouped discrete numerical data, & line graphs for time series data & know their appropriate use	SP2.4 Pie Charts <ul style="list-style-type: none">Interpret & construct pie charts & know their appropriate useInterpret, analyse & compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete data	SP2.5 Displaying Grouped Data <ul style="list-style-type: none">Interpret, analyse & compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving continuous & grouped data	SP2.6 Scatter Diagrams <ul style="list-style-type: none">Interpret, analyse & compare the distributions of bivariate data; recognise correlation; draw estimated lines of best fit; make predictions	SP2.7 Using lines of best fit <ul style="list-style-type: none">Use & interpret scatter graphs of bivariate data; recognise correlation; know that it does not indicate causation; draw estimated lines of best fit; make predictions; interpret the relationship between variables; know the limitations of using lines of best fit	SP2.8 Histograms <ul style="list-style-type: none">Construct & interpret diagrams for grouped discrete data & continuous data, i.e. histograms with equal & unequal class intervals & know their appropriate use						
Collecting Data	SP3.1 Methods of collecting data <ul style="list-style-type: none">This unit has been included to enable students to appreciate the rationale for the techniques they meet in mathematics & to make better use of the statistics opportunities based on the data handling cycle that they will meet in other subjects	SP3.2 Designing questionnaires <ul style="list-style-type: none">This unit has been included to enable students to appreciate the rationale for the techniques they meet in mathematics & to make better use of the statistics opportunities based on the data handling cycle that they will meet in other subjects												
Probability	SP4.1 Introduction to Probability <ul style="list-style-type: none">Use appropriate language & the 0-1 probability scale	SP4.2 Single events <ul style="list-style-type: none">Apply ideas of randomness, fairness & equally likely events to calculate expected outcomes of multiple trialsRecord, describe & analyse the frequency of outcomes of probability experiments using tablesApply the property that the probabilities of an exhaustive set of outcomes sum to oneConstruct theoretical probability spaces for single experiments with equally likely outcomes & use these to calculate theoretical probabilities	SP4.3 Combined events <ul style="list-style-type: none">Enumerate sets & combinations of sets systematically, using tables, grids, & Venn DiagramsConstruct theoretical probability spaces for combined experiments with equally likely outcomes & use these to calculate theoretical probabilities	SP4.4 Estimating probability <ul style="list-style-type: none">Understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size	SP4.5 The multiplication rule <ul style="list-style-type: none">Enumerate sets & combinations of sets systematically, using trees, diagramsCalculate the probability of independent & dependent combined events, including using tree diagrams &amp									