Whole school curriculum intent

Develop a broad and balanced curriculum that enables students to learn, recall and apply knowledge and skills across different contexts, supported by a robust and consistent approach to assessment. This will lead to successful and resilient lifelong learners who can cope in a range of changing contexts.

Key stage 3/4 subject curriculum intent

We aim to inspire our pupils to appreciate the beauty of Mathematics and use its logic skilfully across all areas of the school curriculum and life.

Year Group		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7	Topic	Algebraic Thinking	Place Value and Proportion	Applications of Number	Directed Number and Fractional thinking	Lines and Angles	Reasoning with Number and Probability
	Core knowledge from this topic	Sequences Understand and use algebraic notation Equality and Equivalence	Place Value and ordering integers and decimals Fraction, decimal and percentage equivalence Solving problems with addition, subtraction	Solving problems with multiplication, and division Fractions and percentages of amounts	Operations and equations with directed number Addition and subtraction of fractions	Constructing, measuring and using geometric notation Developing geometric reasoning Developing Number Sense	Sets and Probability Prime Numbers and proof Ratio and Scale
	Links to the national curriculum	A1, A2, A3, A4, A5, A7, A8, A9, A10, A11, A12, A13, A14, A17, A22, A23, A24	N1, N2, N3, N4, N9, N15, N16, N10, N11, N12, S4	N1, N4, N9, N15, N16, N2, N3, N6, N13, N10, N11, N12, R1, R2, R6, R10, G4, G17, S1, S2. S4	N1, N4, N9, N15, N2, N3, N6, N13, N16, A1, A2, A3, A4, A5, A7, A17	N2, N3, N6, N13, N16, A1, A2, A3, A4, A5, R1, R2, R6, R10, S1, S2, G1, G3, G4, G9, G11, G12 G16 G17	P1, P2, P3, P4, P5, P6, R1, R2, R6, R10, R4, R5, R8, R11, G4, G17
	Previous content that this topic builds upon	Use of calculators estimation	Solve equations with fractions including fractional coefficients Consider sequences with fractions	Perimeter problems Equations and simplifying Rounding Distance charts/timetables Mental, written and calculator methods Order of operations	Number lines Inequality number lines Fractions of amounts	Simplifying expressions Perimeter Form and solve equations Mental and formal methods of addition and subtraction, including decimals	Revisit FDP equivalence FDP addition and subtraction Revisit factors and multiples (numerically and algebraically)
	Key vocabulary	Sequence, Term, Position, Rule, Term-to-term, linear, non-linear, difference, ascending, descending, Fibonacci, , estimate, operation, square, inverse, variable, coefficient, expression, Evaluate, substitute, order, bracket, scale, equation, equality, equals, solve, solution, unknown, like, unlike, index, equivalent, simplify, collect	Place value, digit, integer, equal division, interval, approximate, round, order, ascending, descending, leading digit, range, difference, median, middle, order, average, decimal, significant figure, power, index, standard form, percentage, fraction, denominator, Numerator, part, whole, improper, mixed number, rational, recurring, Total, sum, difference, number line, associate, inverse, bridging, difference, column method, place value, exchange, placeholder	Total, sum, difference, number line, associate, inverse, bridging, difference, column method, place value, exchange, placeholder, equivalence, estimating, subtraction, polygon, profit, loss, balance, credit, debit, statement, change, bill, scale, multiple, standard from, power, exponent, significant figure	Product, multiply, divide, inverse, factor, Venn diagram, integer, multiple, common, lowest common multiple, place value, product, efficient, estimate, base, parallel, parallelogram, perpendicular height, trapezium, mean, average, median, range, expression, term, simplify, fraction, equivalent, numerator, denominator, percent, reflection, ascending, descending, add, minus, subtract, substitute, expression, order of operations, equation, function machine, solution, indices, square, square root, denominator, numerator, lowest common multiple, common denominator, improper fraction, sequence, substitute, solve, equation, linear, geometric, inverse, expression, simplify, like terms, collect	Line, line segment, notation, polygon, segment, rotation, angel, acute, obtuse, right-angle, reflex, interior, exterior, protractor, degrees, construct, parallel, perpendicular, intersect, equilateral, isosceles, scalene, square, rectangle, kite, rhombus, parallelogram, polygon, edges, vertices, equal, triangle, point, isosceles, equilateral, scalene, right-angled, regular, rhombus, diagonals, compound, proportion, sector, protractor, adjacent, vertically opposite, intersect, conjecture, transversal, co-interior, corresponding, alternate, demonstration, Compensation, factors, numerator, denominator, factor, equivalent, multiple, rounding, significant figures, overestimate, underestimate, equivalent, product, equation, expression, equality, estimate, interpret	Universal set, inclusive, element, member, set, Venn diagrams, intersection, mutually exclusive, union, element, And, complement, Or, Both, impossible, likely, even, unlikely, certain, random, bias, event, sample space, possibilities, outcomes, event, integer, factorise, Prime number, triangular number, relationship, square number, expression, common factor, highest common lowest common multiple, prime factor, express, Ratio, equal parts, proportion, relationship, order, multiplier, placeholder, share, label, factors, equivalent, divide, simplify, common factors, scale, Compare, perimeter, circumference, constant, pi, regular, diameter
	Development of cultural capital	Sequences link to real-life situations including production lines, architecture and quantity surveying as well as traffic flow modelling.	Pupils develop the skills and understanding to calculate with proportionality. Real life applications include recipes.	Ensure that all pupils can apply all four operations to any problem so that they can confidently apply all skills to functional and "real-life" mathematical problems.	Ensure pupils develop an understanding of FDP to apply to everyday and real-life problems. For example, decimals can be used with money problems so that pupils can apply this to real-life context to deepen understanding.	This is used in construction and architecture when pupils have to accurately draw plans to implement them. They are also regularly used with Flying and the Military, GPS, CCF cadets, Duke of Edinburgh and orienteering.	Ensure that pupils are numerate and confident with calculations
	Development of reading	Guided Reading	Guided Reading	Guided Reading	Guided Reading	Guided Reading	Guided Reading
	Concepts –what will students be able to do at the end of the topic	Sequences • Describe and continue sequences in diagram and	Place Value and Ordering • Recognise and use integer place value up to one billion	Multiplication and division • Multiply by 10, 100, 100, 0.1 and 0.01 and convert metric units	Directed Number • Order directed numbers, both in contextualised and abstract situations	Constructing and Measuring • Understand and use letting and labelling	Sets and Probability • Understand and use set notation

		number forms, both linear and non-linear • Compare numerical and graphical forms Algebraic Notation • Use single function machines and series of two function machines with numbers, bar models and letters • Use and interpret algebraic notation • Understand and use inverse operations • Form and substitute into expression, including to generate sequences • Represent functions graphically Equality and Equivalence • Understand equality • Use fact families • Forma and solve one-step equations • Understand equivalence of algebraic expressions • Collect like terms	• Recognise and use decimal place value to at least hundredths • Work out intervals and use number lines • Compare and order numbers • Use ordered lists to find the range and the median of a set of numbers • Round numbers to positive powers of ten • Round numbers to one significant figure Fraction, decimal and percentage equivalence • Represent tenths and hundredths on diagrams and number lines • Interchange between fractions, decimals and percentages for multiples of one tenths and one quarter • Interpret pie charts • Equivalent fractions • Convert between other fractions, decimals and percentages Addition and Subtraction • Use mental and formal written methods of addition with integers and decimals, including choosing the most appropriate method • Solve problems in the context of perimeter, money and frequency trees and tables • Solve problems in the context of bar charts and line charts	• Use mental and formal written methods of multiplication and division • Find the HCF and LCM of small numbers • Evaluate areas of triangles, rectangles, and parallelograms • Find the mean of a set of numbers • Find simple fractions and percentages of amounts • Begin to use the order of operations Fractions and percentages of amounts • Work out simple fractions and percentages of amounts with and without a calculator	• Revisit four operation to include directed number • Use a calculator with directed number • Solve two-step equations (with and without a calculator) • Use the order of operations Adding and Subtracting fractions • Represent tenths and hundredths on diagrams and number lines • Convert mixed numbers and improper fractions • Add and subtracting fractions with the same denominator, one denominator a multiple of the other and different denominators • Add and subtract fractions and decimals	notation for lines and angles • Draw and measure lines and angles accurately • Classify angles • Identify and draw parallel and perpendicular lines • Recognise types of triangle, quadrilateral and other polygons • Construct triangles given SSS, SAS, ASA • Draw and interpret pie charts Geometric Reasoning • Calculate and use angles at a point, angles on a straight line and vertically opposite angles • Calculate missing angles in triangles and quadrilaterals • Understand and use parallel lines rules • Understand and use the sum of angles in any polygon Developing Number sense • Mental arithmetic strategies • Use known facts to derive other facts • Evaluate an algebraic expression given a related fact • Use estimation	• Draw and interpret Venn diagrams • Understand and use the language of probability • Calculate the probability of a single event • Use the sum of probabilities of an event is 1 Prime Numbers and proof • Recognise prime, square and triangle numbers • Express a number as a product of prime factors • Powers and roots • Make and test conjectures • Understand and use counterexamples Ratio and Scale • Understand ratio and its link to multiplication • Use ratio notation • Reduce ratios to simplest form • Solve ratio problems • Calculate the circumference of a circle
	Additional Higher Content		Explore and use standard index form Explore fractions above one Convert multiple of one eight to decimals and percentages	Explore addition of numbers given in standard form Evaluate area of a trapezium Find the HCF and LCM of algebraic expressions Use fractions greater than 1	Negative square roots Mixed numbers	Understand and use parallel lines rules Understand and use the sum of angles in any regular polygon Derive simple proofs using angles rules	Understand and use the complement of a set Use rime factors to find HCF and LCMs
	Knowledge organisers	Sequences Understand and use algebraic notation Equality and Equivalence	Place Value and ordering integers and decimals Fraction, decimal and percentage equivalence	Solving problems with addition, subtraction, multiplication, and division Fractions and percentages of amounts	Operations and equations with directed number Addition and subtraction of fractions	Constructing, measuring and using geometric notation Developing geometric reasoning Developing Number Sense	Sets and Probability Prime Numbers and proof Ratio and Scale

Mathematics Curriculum Overview Plan 24/25

Year Group		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 8	Topic	Proportional Reasoning	Representations & Algebraic Techniques	Developing Number	Developing Geometry	Reflection and the Data Handling Cycle	Reasoning with Algebra
	Core knowledge from this topic	Multiplicative Change Multiplying and Dividing Fractions Working in the Cartesian Plane	Representing data Tables and probability Brackets, equation and inequalities Sequences Indices	Fractions and percentages Standard Index Form Number Sense	Angles in parallel lines and polygons Area of trapezia and circles	Line symmetry and reflection The data handling cycle Measures of location	Forming and solving equations Rotation and translation
	Links to the national curriculum	N2, N3, N6, N13, N16, A8, A9, A10, A11, A12, A13, A14, A17, A8, A9, A10, A11, A12, A13, A14, A17	S1, S2, S6, P1, P2, P3, P4, P5, P6, A1, A2, A3, A4, A5, A7, A17, A22, A23, A24	N1, N4, N9, N15, N2, N3, N6, N7, N13, N16, N10, N11, N12	G1, G3, G4, G9, G11	G12 G16 G17, R1, R2, R6, R10, S1, S2, S4	A10, A11, A12, A13, A14, A17 A22, A23, A24, G1, G3, G4, G9, G11, G12, G13
	Previous content that this topic builds upon	Interleaving links Revisit area Revisit equation Revisit converting improper fractions and mixed numbers Fractions of an amount	Revisit calculation with directed number Link to solving one and two-step linear equations Revisiting Venn diagrams and set notation Representing data and using graphs Directed number Solve equations with shapes, angles, probability, ratio	Interleaving links Fraction, decimal and percentage equivalence Evaluate percentage increase and decrease	Forming and Solving equations Properties of shapes Equation of straight lines	Properties of shapes Equation of straight lines Finding the range Use algebraic substitution to form lists for averages and the range Data collection and representations	Link equations of graphs to solving equations. Make sure that you revisit key topics through equations, brackets and geometric properties and rules. Compare and contrast rotational symmetry with line symmetry. Identify 2D and 3D shapes, link constructions and geometric reasoning
	Key vocabulary	Gradient, slope, steep, linear, variable, axes, labelling, conversion, approximation, exchange rate, currency, estimate, sterling, rate, directly proportional, origin, relationship, similar, corresponding, scale factor, enlargement, plan, image, distance, metric, numerator, denominator, product, reciprocal, convert, simplify, factors, denominators, term, expression, simplest form, Quadrant, coordinates, horizontal, vertical, axis, origin, parallel, , vertical, horizontal, equation, scale, graph, multiple, steep, linear, axes, proportion, direct, difference, gradient, equation, intercept, incline, sequence, descending, ascending, non-linear, symmetrical, midpoint, equidistant, segment,	Mean, variable, correlation, outlier, discrete, continuous, qualitative, quantitative, frequency, ungrouped, range, set, probability, systemic, chance, event, equally likely, unbiased, P(event), sample, set, intersection, And/Or, union, region, possibilities, outcomes, product, Expression, simplify, term, substitute, coefficient, equivalent, directed, solve, expand, identity, factor, factorise, HCF, expression, like terms, unlike terms, equivalent, solution, equation, inequality, satisfy, formula, subject, sequence, position, term, linear, Fibonacci, difference, constant, term-to-term, integer, Index, indices, power, product, base	Equivalent, denominator, numerator, estimate, multiplier, growth, express, profit, loss, interest, change, reverse, index, indices, power, standard from, negative, place value, , reciprocal, root, significant, integer, number line, decimal place, discrete, continuous, bound, operation, order, priority, change, deposit, interest, debit, credit, balance, metric, metre, prefix, kilo, milli, centi, area, perpendicular, square units, dimensions, cubic units, 12-hour clock, 24-hour, clock, week, month, year, leap year	Adjacent, angles at a point, vertically opposite, straight, acute, obtuse, reflex, right angle, parallel, transversal, alternate, corresponding, co-interior, isosceles, equilateral, scalene, rhombus, parallelogram, square, trapezium rectangle, kite, perpendicular, bisect, delta, exterior, interior, regular, polygon, sum, total, pentagon, hexagon, bisect, bisector, acute, obtuse, compasses, sector, estimate, infinity, radius, pi, approximately, radius, diameter,	Line symmetry, polygon, reflect, congruent, object, image, vertical, horizontal, vertex, perpendicular distance, Hypothesis, investigation, enquiry, primary data, secondary data, sample, pictogram, bar chart, line chart, tally, frequency, pie chart, fraction, full tern, proportion, axes, scale, change, read off, read from, comparison, scatter graph, bivariate, grouped data, frequency diagram, discrete, continuous, intervals, range, spread, consistent, average, compare, distribution, broken axis, difference, average, mean, median, mode, modal value, estimate, midpoint, modal class	Solution, unknown, inverse, solve, inverse, expand, satisfy, reverse, coefficient, variable, subject, make the subject of, inverse operation, rotation, translation, column vector, clockwise, anti-clockwise, centre of rotation, transformation.
	Development of cultural capital	Pupils develop the skills and understanding to calculate with proportionality. Real life applications include recipes.	Understanding and interpreting statistical data in the media to develop and support their own opinions.	Percentages are used as "everyday maths" when calculating interest rates, offers and sales with "percentage off". The intention will allow pupils to develop confidence to calculate with percentages	Links to projections for profit and loss as well as manufacturing processes for large scale productions.	Understanding and interpreting statistical data in the media to develop and support their own opinions	Exposing pupils to "real-life" maths so that they develop the confidence to apply their own skills and knowledge to functional style questions involving more than one skill (usually involving money).
	Development of reading	Guided Reading	Guided Reading	Guided Reading	Guided Reading	Guided Reading	Guided Reading
	Concepts –what will students be able to do at the end of the topic	Multiplicative Change • Use scale factors, linking to ratio to solve simple direct proportion problems • Convert between currencies, including using graphs	Representing data • Draw and interpret scatter graphs • Understand correlation • Draw and use lines of best fit	Fractions and percentages • Develop understanding of fractions, decimals and percentages • Evaluate percentage increases and decrease	Angles in parallel lines and polygons • Revisit angle rules • Understand and use parallel lines and angles • Revisit geometric notation	Line symmetry and reflection • Recognise line symmetry in polygons and other shapes Reflect shapes in horizontal, vertical and diagonal lines	**Forming and solving Equations** -Solve one and two step equations and inequalities -solve one and two step equation and inequalities with brackets

		• Draw and interpret scale diagrams and maps Multiplying and Dividing Fractions • Multiply and divide a fraction by an integer • Multiply and divide a fraction by a fraction • Understand and use the reciprocal Working in the Cartesian Plane • Plot and interpret straight line graphs • Understand and use the equations of a straight line, including lines parallel to the axes • Make links between direct proportion and straight lines of the form y=kx • Model situation by translating them into expression, formulae and graphs	• Understand grouped and ungrouped, discrete and continuous data • Design and use one and two-way tables Tables and probability • List outcomes using sample space diagrams for one and two events • Find probabilities using tables and Venn diagrams Brackets, equation and inequations • Expand and factorise into single brackets • Form and use expressions, formulae and identities • Form and use expressions, formulae and identities • Form and solve equations and inequalities with and without brackets • Distinguish between equation expression formulae and identities Sequences • Generate sequences using more complex rules, eg; with brackets and squared terms, both in words and algebraically Indices • Form expressions using indices • Understand and use the addition and subtraction rules	• Use multipliers to solve percentage problems • Express one number as a percentage of another Standard Index Form • Convert between numbers in ordinary form and standard form • Compare numbers given in standard form • Calculate with numbers given in standard form, with and without a calculator Number Sense • Develop mental strategies • Convert between metric measures and units • Decimal places • Use the order of operations	• Work out angles in special quadrilaterals • Find and use the sum of interior and exterior angles of a polygon • Prove simple geometric facts Area of trapezia and circles • Review area of shapes covered in year 7 • Calculate the area of a trapezium • Calculate the area of a circle and the area of parts of a circle • Use significant figures • Calculate the area of compound shapes	The data handling cycle • Understand and use primary and secondary sources of data • Collect data, including using questionnaires • Interpret and construct statistical diagrams, including multiple bar charts • Construct and interpret pie charts • Compare distributions using charts • Identify misleading graphs Measures of location • Revisit the median and mean, including finding the total given for the mean • Find the mean of grouped data • Work out the mode and modal class • Choose the appropriate average • Comparing distributions using measure	-Inequalities with negative numbers - Solve equations with unknowns on both sides -Solve inequalities with unknowns on both sides -solving equations and inequalities in context -substituting into formulae and equations -rearrange formulae (one-step) -rearrange formulae (two-step) Rotation and translation -Identify the order of rotational symmetry of a shape -compare and contrast rotational symmetry with line symmetry -rotate a shape about a point of a shape -rotate a shape about a point not on a shape -translate points and shapes by a given vector -compare rotation and reflection of shapes
	Additional Higher Content	Express any ratio in the form 1:n Explore direct proportion graphs Multiply and divide mixed numbers Multiply and divide simple algebraic fractions	Find the mid-point of a line segment Explore gradient Explore non-linear graphs Use the product rule for counting	Expand a pair of binomials Solve equation and inequalities with unknown on both sides Find the rule for nth term of a linear sequence Explore powers of powers	Perform standard constructions including perpendiculars Understand and use the properties of diagonals of quadrilaterals	Find unknown data values given the mean or changes in the mean Explore histograms for unequal groups Find the median from a table of values	Rearrange complex formulae including brackets and squares
	Knowledge organisers	Multiplicative Change Multiplying and Dividing Fractions	Working in the Cartesian Plane Representing data Tables and probability	Brackets, equation and inequalities Sequences Indices	Angels in parallel lines and polygons Area of trapezia and circles Line symmetry and reflection	The data handling cycle Measures of location Line symmetry and reflection	Forming and solving equations Rotation and translation

Year Group		Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Year 9	Topic	Reasoning with Algebra	Reasoning with Number	Reasoning with Geometry	Enlargement and Trigonometry	Reasoning with proportion and Probability	Representations and Simultaneous Equations
	Core knowledge from this topic	Straight line graphs Testing conjectures Three-dimensional shapes	Numbers Using percentages Maths and money Constructions and congruency	Deduction Pythagoras' Theorem Vectors	Enlargement and similarity Trigonometry	Solving ratio and proportion problems Rates Probability	Algebraic representations Simultaneous Equations
	Links to the national curriculum	A1, A2, A3, A4, A5, A7, A8, A9, A10, A11, A12, A13, A14, A17 A22, A23, A24, R1, R2, R6, R10, G9, G11, G12	N1, N4, N9, N15, N2, N3, N6, N13, N16, N10, N11, N12, R4, R5, R8, R11, G9, G11, G12 G16 G17	G1, G3, G4, G9, G11, G12, G13 G16 G17	G11, G12, G13 G16 G17	R1, R2, R6, R10, R4, R5, R8, R11, P1, P2, P3, P4, P5, P6,	A1, A2, A3, A4, A5, A7, A8, A9, A10, A11, A12, A13, A14, A17 A22, A23, A24
	Previous content that this topic builds upon	Link equations of graphs to solving equations. Make sure that you revisit key topics through equations, brackets and geometric properties and rules. Also revisit unit conversions including area and volume units	Add and subtract fraction (lowest common denominator), working out fractions of amounts, FDP equivalence and ratio. Revisit estimations, rounding to the nearest integer, decimals places and significant figures.	Revisit fractions and directed number in the context of rotation.	Revisit work on transformations and Pythagoras theorem.	Link to ration notation, revisit circumference, y=mx+c and unit pricing. Revisit frequency trees, tables and Venn diagrams.	Revisit inequalities and solving equations and substitution.
	Key vocabulary	Parallel, horizontal, vertical, straight line, axis, equation, graph, intercept, linear, equation, table of values, function, gradient, slope steep, coordinate, y-intercept, linear, rearrange, perpendicular, product, reciprocal, negative, reciprocal, square/root, factor, multiple, prime, common, odd, even, express, conjecture, verify, demonstrate, expand, factorise, binomial, term, quadratic, Dimensions, cube, cuboid, cylinder, cone, sphere, pyramid, tetrahedron, face, edge, vertex, polygon, prism, cross-section, net, plan, front elevation, side elevation, area, perpendicular, height, compound.	Integer, real, rational, irrational, root, surd, simplify, directed, inverse, square, cube, product, sum, difference, remainder, factor, multiple, prime, HCF, LCM, product of primes, fraction, numerator, denominator, mixed number, improper fraction, standard form, percentage, convert, equivalent, reduce, multiplier, profit, loss, original, change, increase, decrease, reverse, depreciate, power, index, total, debt, credit, balance, expense, annual, deposit, per annum, tax, value added, income, salary, exemption, wage, overtime, currency, convert, proportion, cost., acute, obtuse, reflex, right-angle, estimate, protractor, scale, ratio, multiplier, locus, path, equidistant, construction lines, point, arc, bisector, line segment, congruent	Product, multiply, divide, inverse, factor, Venn diagram, odd, even, integer, multiple, common, lowest common multiple, place value, product, efficient, estimate, order, operation, base, parallel, parallelogram, perpendicular height, trapezium, mean, average, median, range, expression, term, simplify, fraction, equivalent, numerator, denominator, whole, percent, symmetric, ascending, descending, Increase, decrease, add, minus, subtract, substitute, expression, order of operations, equation, solution, sequence, substitute, solve, equation, linear, inverse, expression, simplify, like terms, collect,	Directly proportional, similar, corresponding, scale factor, not to scale, enlargement, plan, metric, product, reciprocal, convert, simplify, factors, term, expression, simplest form	Ratio, equal parts, proportion, order, colon, divide, proportional, multiply, part, multiplier, placeholder, share, total, factors, equivalent, divide, simplify, common factors, scale, compare, perimeter, circumference, constant, pi, regular, diameter, gradient, slope, steep, linear, variable, axes, labelling, conversion, approximation, exchange rate, currency, estimate, sterling, rate, fraction, percentage, outcomes, sample space, set, probability, systemic, chance, event, equally likely, unbiased, P(event), set, intersection, And/Or, union, region, total, possibilities, outcomes	Product, sequence, Term, Position, Rule, Term-to-term, linear, non-linear, difference, constant difference, ascending, descending, arithmetic, Fibonacci, estimate, operation, inverse, variable, coefficient, expression, evaluate, substitute, order, bracket, constant, scale, curve, equation, equality, solve, solution, unknown, like, unlike, index, equivalent, simplify,
	Development of cultural capital	Exposing pupils to "real-life" maths so that they develop the confidence to apply their own skills and knowledge to functional style questions involving more than one skill (usually involving money).	Exploring everyday finances, budgeting, tax and salary	Pupils can apply these skills to real-life situation such as building and constructions.		Pupils develop the skills and understanding to calculate with proportionality. Real life applications include recipes.	Exposing pupils to "real-life" maths so that they develop the confidence to apply their own skills and knowledge to functional style questions involving more than one skill.
	Development of reading	Guided Reading	Guided Reading	Guided Reading	Guided Reading	Guided Reading	Guided Reading
	Concepts –what will students be able to do at the end of the topic	**Straight line graphs** -lines parallel to the axes, y=x and y = -x - Using a table of values -compare gradients Compare intercepts Understand and use y=mx+c Find an equation of a line from a graph	**Constructions and congruency** -draw and measure angles -construct and interpret scale drawings -locus of distance from a point -locus of distance from a straight line/shape -construct a perpendicular bisector -construct a perpendicular from a point	Deduction -angles in parallel lines -solving angles problems (using chains of reasoning) -Angles problems with algebra -Conjectures with angles -conjectures with shapes Pythagoras' Theorem	Enlargement and similarity -Recognise enlargement and similarity -enlarge a shape by a positive integer scale factor -enlarge a shape by a positive integer scale factor from a point -enlarge a shape by a positive fractional scale factor	Solving ratio and proportion problems -Solve problems with direct proportion -direct proportion and conversion graphs -solve problems with inverse proportion _solve ratio problems give the whole or a part	Algebraic Representation -Find the rule for the nth term of a sequence Representing problems -using graphs, equations, tables Simultaneous Equations

		Interpret gradient and intercepts of real-life **Testing conjectures** -Factors, multiples and primes -Always, sometimes, Never true -Conjectures about number -Expand a pair of binomials - Conjectures with algebra Explore the 100 grid **Three-dimensional shapes** -Know names of 2D and 3D shapes Recognise prisms -Accurate nets of cuboids and other 3D shapes -Sketch and recognise nets of cuboids and other 3D shapes -plans and elevations -find area of 2D shapes -surface area of cubes and cuboids -surface area of triangular prisms -Surface area of triangular prisms -surface area of a cylinder -volume of cubes and cuboids	-construct a perpendicular to a point -Locus of distance from two lines -construct an angle bisector -construct triangle from given information -identify congruent figures -explore congruent triangles -identify congruent triangles Numbers -integers, real and rational numbers -work with directed number -solve problems with integers -solve problems with decimals -HCF and LCM -Adding and subtracting fractions -multiplying and dividing fractions -solving problems with fractions -numbers in standard form Using percentages -Use the equivalence of fractions, decimals and percentages -calculate percentage increase and decrease -Express a change as a percentage -solve reverse percentage problems -recognise and solve percentage problems (non-calculator) -recognise and solve percentage problems (calculator) Maths and money -solve problems with bulls and bank statements -calculate simple interest -calculate compound interest -solve problems with Value Added Tax -Calculate wages and taxes -solve problems with exchange rates -solve unit pricing problems	-Squares and square roots -Identify the hypotenuse of a right-angled triangle -Determine whether a triangle is a right-angle -calculate the hypotenuse of a right-angled triangle -calculate missing sides in right-angled triangles -use Pythagoras theorem on coordinate axes -explore proofs of Pythagoras' theorem	-Work out missing sides and angles in a pair of given similar shapes Trigonometry -extend and formalise knowledge of ratio and proportion, including trigonometric ratios -apply Pythagoras' Theorem and trigonometric ratios to find angles and lengths in right-angled triangles -know the exact values of sin θ, cos θ, tan θ for required angles	-solve "best buy" problems Rates -Solve speed, distance and time problems without a calculator -Solve speed, distance and time problems with a calculator -Use distance/time graphs -solve problems with density, mass and volume -solve flow problems and their graphs -rates of change and their units Probability -single event probability -relative frequency – include convergence -expected outcomes -independent events - use diagrams to work out probabilities Algebraic representations -Draw and interpret quadratic graphs -Interpret graphs including reciprocal and piece-wise -represent inequalities	-Algebraic simplification and manipulation of quadratic expressions -Derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution -Solve two linear simultaneous equations algebraically -Recognise, sketch and interpret graphs of linear functions and quadratic functions
	Additional Higher Content	Write an equation in the from y=mx+c Model real-life graphs involving inverse proportion Explore perpendicular lines Explore volume of cones, pyramids and spheres	Understand and use surds Solve problems with repeated percentage change	Links construction and geometrical reasoning Find the result of a series of transformations Us Pythagoras' theorem in 3D shapes	-Enlarge a shape by a negative scale factor -Solve problems with similar triangles -Know and apply the sine rule and cosine rule to find unknown lengths and angles. -Know and apply to calculate the area, sides or angles of any triangle.	-Explore ratios in right-angles triangles -Graphs of inverse relationships -solve problems ratio and algebra -convert compound units -use tree diagrams -use tree diagrams to solve without replacement problems	-Investigate graphs of simultaneous equations -Solve two simultaneous equations in two variables (linear/linear {or linear/quadratic}) algebraically

Mathematics Curriculum Overview Plan 24/25

	Knowledge organisers	Straight line graphs Forming and solving equations Testing conjectures Three-dimensional shapes	Constructions and congruency Numbers Using percentages Maths and money	Deduction Pythagoras' Theorem	Enlargement and similarity	Solving ratio and proportion problems Rates Probability	Algebraic representations Simultaneous Equations
Year Group		Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Year 10 Foundation	Topic						
	Core knowledge from this topic	Basic Number Factors and Multiples Rounding Basic Algebra Angles Scale Diagrams and Bearings Equations Collecting and Representing Data	Scatter Graphs Basic FDP and Money Sequences Co-ordinates and Linear Graphs	Perimeter and Circumference Real Life Graphs Area including circles Ratio and Proportion Properties of Polygons	Indices Inequalities Basic Probability Standard Form Measures	Algebra: Quadratics, rearranging formulae and identities Transformations 2D Representations in Constructing Triangles Congruence and Similarity Calculating with Percentages Pythagoras Theorem	Basic Trigonometry Statistical Measures Constructions and Loci Simultaneous Equations
	Links to the national curriculum (if applicable)	N1, N2, N3, N10, N14, R2, G15, N15, N16, A1, A3, A4, N4 and N5	N1, N2, N10, S6, A8, G11, A9, A10, A23, A24 and A25	G8, G12, G16, G17, G18, A14, R14, N11, R3, R4, R5, R6, R7, R8, G3, G4	A2, A17, N6, N17, P1, P4, P7, N8, A22, A24, N2, N9, N16, G14, N13, R1, R11	G7, G24, G8, G5, G6, G19, G13, R9	S1, S4, S5, G2, A19, A21, G25, A13
	Previous content that this topic builds upon	Ordering numbers including fractions and decimals. Using the four operations with simple decimal problems up to 3 digits. Solving problems involving adding and subtraction of decimals. Understand place value and one decimal place. Working with pounds and pence which lends itself to working with decimals. Knowledge that numbers below zero can be non-integers and be written in a decimal format.	Students will have an appreciation of place value and recognise even and odd numbers. Students will have knowledge of using the four operations with whole numbers. Students should have knowledge of integer complements to 10 and to 100. Students should have knowledge of strategies for multiplying and dividing whole numbers by 2, 4, 5, and 10. Students should be able to read and write decimals in figures and words	Students should be able to measure lines and recall the names of 2D shapes. Students should be able to use strategies for multiplying and dividing by powers of 10. Students should be able to find areas by counting squares and volumes by counting cubes. Students should be able to interpret scales on a range of measuring instruments.	Students should be able to interpret scales on a range of measuring instruments. Students should be able to find a percentage of an amount and relate percentages to decimals. Students should be able to rearrange equations and use these to solve problems.	Students should be able to read scales on graphs, draw circles, measure angles and plot coordinates in the first quadrant, and know that there are 360 degrees in a full turn and 180 degrees at a point on a straight line. Students should have experience of tally charts. Students will have used inequality notation. Students must be able to find the midpoint of two numbers. Students should be able to use the correct notation for time using 12- and 24-hour clocks	Students need to be able to convert between fractions, decimals and percentages. It is likely that students will be familiar with basic probability ideas from Key Stage 3, but they can access the materials in this topic without any prior knowledge. How to multiply a single term over a bracket. How to factorise a linear expression. How to collect like terms. How to calculate area and perimeter of rectangles or compound shapes made up of rectangles. Students will hopefully have seen the skill of substitution before but might need a recap. How to and why you can simplify a fraction.
	Key vocabulary	Expression, identity, equation, formula, substitute, term, like terms, index, power, collect, substitute, simplify, Integer, number, digit, negative, decimal, addition, subtraction, multiplication, division, remainder, operation, estimate, power, roots, factor, multiple, primes, square, cube, even, odd, inverse, fractions, mixed, improper, recurring, integer, decimal, terminating, percentage	Place value, digit, placeholder, integer, scale, approximate, round, nearest, halfway, compare, not equal, greater than, less than, order, ascending, descending, range, difference, median, average, tenth, hundredth, significant figure, power, index, standard form, rational, recurring Sequence, Term, Position, Rule, Term-to-term, table, linear, non-linear, difference, ascending, descending, arithmetic, Fibonacci, discrete, continuous, qualitative, quantitative, frequency, ungrouped, range, class, class boundary, outcomes, set, probability, systemic, chance, event, equally likely, unbiased, P(event), sample, convert,	Line, line segment, notation, polygon, angels, rotation, angel, acute, obtuse, right-angle, reflex, interior, exterior, sum, measure, construct, parallel, perpendicular, intersect, equilateral, isosceles, scalene, right-angled, square, rectangle, kite, rhombus, parallelogram, polygon, edges, vertices, equal, vertex, point, isosceles, equilateral, scalene, right-angled, regular, rhombus, diagonals, compound, Triangle, rectangle, parallelogram, trapezium, area, perimeter, prism, compound, measurement, polygon, cuboid, volume, vertices, edge, face, units, conversion, diameter, radius, chord, circumference, Ratio, proportion, simplify, common factors, scale, compare,	Ratio, proportion, best value, proportional change, compound measure, density, mass, volume, speed, distance, time, density, mass, volume, pressure, acceleration, velocity, inverse, direct, standard from, power, exponent, significant figure, outcomes, sample space, set, probability, systemic, chance, event, equally likely, unbiased, P(event), set, intersection, And/Or, union, region, product, unknown, inverse, solve, inverse, expand, reverse, coefficient, variable, subject, make the subject of, inverse operation, square/root	congruent, similar, ratio, scale factor, multiplier, reflection, rotation, translation, enlargement, line symmetry, polygon, reflect, congruent, object, image, vertical, horizontal, vertex, perpendicular distance, percentage, convert, equivalent, increase, decrease, reduce, multiplier, profit, loss, original, change, increase, decrease, reverse, related facts, depreciate, power, index,	Plan, front elevation, side elevation, perspective, isometric, solid, area, perpendicular, height, formulae, compound, commutative, acute, obtuse, reflex, right-angle, estimate, protractor, scale, ratio, multiplier, locus, path, equidistant, construction lines, point, arc, bisector, line segment, congruent,

		equivalent, , multiplier, change, increase, decrease,	circumference, constant, pi, regular, diameter, gradient, slope, steep, axes, labelling, conversion, approximation, exchange rate, currency, estimate, directly proportional			
Development of cultural capital	Ensure that all pupils can apply all four operations to any problem so that they can confidently apply all skills to functional and "real-life" mathematical problems.	Sequences link to real-life situations including production lines, architecture and quantity surveying as well as traffic flow modelling.	Pupils develop the skills and understanding to calculate with proportionality. Real life applications include recipes. Real-life graphs expose pupils to distance-time graphs that have real-world applications.	Scientists use standard form when working with the speed of light and distances between galaxies, which can be enormous. The size of bacteria may also be referred to in standard form as they are so tiny.	Plans and elevations are needed in constructions, building and quantity surveying. An elevation drawing is an orthographic projection drawing that shows one side of the house. The purpose of an elevation drawing is to show the finished appearance of a given side of a house and furnish vertical height dimensions.	Real-life links can be made to data analysts and market research.
Development of reading	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.
Concepts –what will students be able to do at the end of the topic	*Basic Number* ➤ *Order positive and negative integers* ➤ *Use the symbols =, ≠, <, >, ≤, ≥* ➤ *Apply the four operations, including formal written methods, to integers – both positive and negative* ➤ *Understand and use place value* ➤ *Estimate answers* Factors and Multiples ➤ Use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation, and the unique factorisation theorem Rounding ➤ Round numbers and measures to an appropriate degree of accuracy ➤ Use inequality notation to specify simple error intervals due to truncation or rounding Basic Algebra ➤ Use and interpret algebraic notation.	Scatter Graphs ➤ Use and interpret scatter graphs ➤ Recognise correlation ➤ Draw estimated lines of best fit and make predictions Basic Decimals ➤ Apply the four operations, including formal written methods, to decimals – both positive and negative ➤ Work interchangeably with terminating decimals and their corresponding fractions Basic Fractions ➤ Apply the four operations, including formal written methods, to simple fractions Percentages ➤ Express one quantity as a percentage of another ➤ Compare two quantities using percentages Sequences ➤ Generate terms of a sequence from either a term-to-term or a position-to-term rule ➤ Recognise and use: ➤ sequences of triangular, square and cube	Perimeter and Circumference ➤ Calculate the perimeters of 2D shapes and composite shapes ➤ Circumference of a circle = $2\pi r = \pi d$ ➤ Calculate perimeters of 2D shapes including circles and composite shapes Real Life Graphs ➤ Plot and interpret graphs (including reciprocal graphs) and graphs of non-standard functions in real contexts. ➤ Interpret the gradient of a straight-line graph as a rate of change Area including circles ➤ Know and apply formulae to calculate area of: – triangles – parallelograms – trapezia – Area of a circle = πr^2 ➤ Calculate areas of circles and composite shapes ➤ Calculate surface area of spheres, cones and composite solids Ratio and Proportion ➤ Divide a given quantity into two parts in a given part: part or part: whole ratio	Indices ➤ Use positive integer powers and associated real roots (square, cube and higher) ➤ Calculate with roots and with integer indices Inequalities ➤ Solve linear inequalities in one variable ➤ Represent the solution set on a number line Basic Probability ➤ Apply the property that the probabilities of an exhaustive set of outcomes sum to 1 ➤ Apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one ➤ Record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees ➤ Construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities	Algebra: Quadratics, rearranging formulae and identities ➤ Simplify and manipulate algebraic expressions (including those involving surds) by: – simplifying expressions involving sums, products and powers, including the laws of indices – expanding products of two binomials – factorising quadratic expressions of the form $x^2 + bx + c$ including the difference of two squares ➤ Rearrange formulae to change the subject ➤ Know the difference between an equation and an identity ➤ Argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments Transformations ➤ Identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection, translation and enlargement including	Basic Trigonometry ➤ Know and use the Trigonometric ratios ➤ Apply them to find angles and lengths in right-angled triangles in two dimensional figures ➤ Know the exact values of $\sin\vartheta$ and $\cos\vartheta$ for $\vartheta = 0^0$, 30^0, 45^0, 60^0 and 90^0 ➤ Know the exact value of $\tan\vartheta$ for $\vartheta = 0^0$, 30^0, 45^0, 60^0 Statistical Measures ➤ Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through : – appropriate measures of central tendency (median, mean, mode and modal class) – spread (range, including consideration of outliers, quartiles and inter-quartile range) ➤ Apply statistics to describe a population Constructions and Loci ➤ use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a

- Understand and use the concepts and vocabulary of expressions, equations, formulae, identities, inequalities, terms and factors.
- Simplify and manipulate algebraic expressions

Angles
- Draw diagrams from written descriptions
- Apply the properties of:
- angles at a point
- angles at a point on a straight line
- vertically opposite angles
- Understand and use alternate and corresponding angles on parallel lines

Scale Diagrams and Bearings
- Use scale factors, scale diagrams and maps

Equations
- Substitute numerical values into formulae and expressions, including scientific formulae
- Solve linear equations in one unknown algebraically including those with the unknown on both sides of the equation

Collecting and Representing Data
- Interpret and construct tables, charts and diagrams, including: frequency tables, line graphs, bar charts, pie charts and pictograms

numbers, simple arithmetic progression, Fibonacci-type sequences and quadratic sequences
- Calculate the nth term of a linear sequence

Co-ordinates and Linear Graphs
- Work with coordinates in all four quadrants
- Plot graphs of equations that correspond to straight-line graphs
- Find the equation of the line through two given points, or through one point with a given gradient
- Plot graphs of equations that correspond to straight-line graphs in the coodinate plane.
- Use the form $y = mx + c$ to identify parallel lines
- Find the equation of the line through two given points, or through one point with a given gradient

- Express the division of a quantity into two parts as a ratio
- Apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing and concentrations)

Properties of Polygons
- Derive and use the sum of angles in a triangle (eg to deduce and use the angle sum in any polygon, and to derive properties of regular polygons)

Standard Form
- Understand and use place
- Calculate with and interpret standard from $A \times 10^n$ where $1 \leq A < 10$ and n is an integer

Measures
- Use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money etc.)
- Use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate
- Change freely between related standard units
- Use compound units such as speed, rates of pay, unit pricing, density and pressure

fractional and negative scale factors
- Describe translations as 2D vectors
- Describe the changes and invariance achieved by combinations of rotations, reflections and translations

2D Representations and Constructing Triangles
- Construct and interpret plans and elevations of 3D shapes

Congruence and Similarity
- Use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS)
- Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including the fact that the base angles of an isosceles triangle are equal, and use known results to obtain simple proofs
- Apply and use the concepts of congruence and similarity, including the relationships between lengths, areas and volumes in similar figures

Calculating with Percentages
- Solve problems involving percentage change, including :
- percentage increase/decrease problems
- original value problems
- simple interest, including in financial mathematics

Pythagoras Theorem

perpendicular to a given line from/at a given point, bisecting a given angle
- Use these to construct given figures and solve loci problems
- Know that the perpendicular distance from a point to a line is the shortest distance to the line

Simultaneous Equations
- Solve two simultaneous equations in two variables (linear/linear) algebraically
- Find approximate solutions using a graph
- Translate simple situations or procedures into algebraic expressions or formulae
- Derive two simultaneous equations, solve the equations and interpret the solution

						➢ Know the formula for Pythagoras' Theorem $a2 + b2 = c2$ ➢ Apply it to find lengths in right angled triangles in two dimensional figures	
Knowledge organisers		Basic Number Factors and Multiples Rounding Basic Algebra Angles Scale Diagrams and Bearings Equations Collecting and Representing Data	Scatter Graphs Basic FDP and Money Sequences Co-ordinates and Linear Graphs	Perimeter and Circumference Real Life Graphs Area including circles Ratio and Proportion Properties of Polygons	Indices Inequalities Basic Probability Standard Form Measures	Algebra: Quadratics, rearranging formulae and identities Transformations 2D Representations in Constructing Triangles Congruence and Similarity Calculating with Percentages Pythagoras Theorem	Basic Trigonometry Statistical Measures Constructions and Loci Simultaneous Equations
Year Group		**Autumn Term 1**	**Autumn Term 2**	**Spring Term 1**	**Spring Term 2**	**Summer Term 1**	**Summer Term 2**
Year 10 Higher	Topic						
	Core knowledge from this topic	Rounding, estimating and bounds Percentages Angles, scale diagrams and Bearings Algebra: Quadratics, rearranging formulae and Identities Sequences	Collecting and Representing data including scatter graphs Perimeter and Circumference Area including circles and sectors Coordinates and Linear Graphs Real Life Graphs Properties of Polygons	Indices Surds Probability Standard Form Measures	2D Representations Transformations and Vectors Further Equations and Graphs Numerical Methods	Congruence and Similarity Equation of a Circle Construction and Loci	Pythagoras and Basic Trigonometry within right angled triangles Higher Trigonometry Simultaneous Equations
	Links to the national curriculum (if applicable)	G1, G3, R2, G15, N1, N2, N3, N4, N5, A1, A2, A3, N8, N10, A8, A9, A10, G11, A4, A5, A6, R9	N15, N16, S2, S3, S4, A23, A24, A25, R9, N12, S6, G8, G12, G16, G17, G18, A14, R14, N11, R3, R4, R5, R6, R7, R8	N6, N7, N8, G3, G4, P2, P3, P5, P6, P8, P9, A2, A17, N6, N17, P1, P4, P7, N8, A24, N2, N9, N16, G14, N13, R1, R11,	G25, A18, A12, A11, A21, A20, G13, G7, G24, G8	G2, G5, G6, G19, R9, A16	S1, S4, S5, G20, G21, G6, R12, A19, A21, G22, G23
	Previous content that this topic builds upon	Students should be able to use the four operations with integers, decimals and fractions. Students should have a good understanding of basic algebraic principles and be confident at expanding and factorising linear expressions.	Students should know basic area and perimeter formula for 2D shapes. Students should also be confident in basic ratio and proportion principles.	Students should be able to rearrange equations and use these to solve problems. Students should know speed = distance/time, density = mass/volume.	Students should know how to do reflections, rotations, enlargements with a positive integer scale factor and translations. Students should be comfortable using their scientific calculator.	Students should know how to use a compass and construct a circle of a specified radius. Students should know how to find a scale factor.	Students should be able to solve equations and understand algebraic substitution.
	Key vocabulary	Expression, identity, equation, formula, substitute, term, like terms, index, power, collect, substitute, simplify, Integer, number, digit, negative, decimal, addition, subtraction, multiplication, division, remainder, operation, estimate, power, roots, factor, multiple, primes, square, cube, even, odd, inverse, fractions, mixed, improper, recurring, integer, decimal, terminating, percentage	Place value, digit, placeholder, integer, equal division, interval, scale, approximate, round, nearest, halfway, compare, order, ascending, descending, range, greatest, least, difference, median, middle, order, average, decimal, , significant figure, power, index, standard form, percentage, fraction, denominator, Numerator, part, whole, improper, mixed number, rational, recurring Sequence, Term, Position, Rule, Term-to-term, table, linear, non-linear, Fibonacci, discrete, continuous, qualitative, quantitative, frequency, ungrouped, total, class, Fraction,	Line, line segment, geometric figure, notation, polygon, segment, angels, rotation, angel, acute, obtuse, right-angle, reflex, interior, exterior, protractor, degrees right-angle, half-turn, sum, measure, construct, parallel, perpendicular, intersect, equilateral, isosceles, scalene, right-angled, length, angle, square, rectangle, kite, rhombus, parallelogram, polygon, edges, vertices, angles, equal, length, compasses, vertex, point, isosceles, equilateral, scalene, right-angled, regular, rhombus, diagonals, compound,, Triangle, rectangle, parallelogram, trapezium, area, perimeter, formula, length, width,	Ratio, proportion, best value, proportional change, compound measure, density, mass, volume, speed, distance, time, density, mass, volume, pressure, acceleration, velocity, inverse, direct, standard from, power, exponent, significant figure, Fraction, Percentage, outcomes, set, probability, systemic, chance, event, equally likely, unbiased, P(event), set, intersection, And/Or, union, possibilities, outcomes, product, solution, unknown, inverse, solve, expand, reverse, coefficient, variable, subject, inverse operation, square/root	congruent, similar, ratio, scale factor, multiplier, reflection, rotation, translation, enlargement, line symmetry, polygon, reflect, congruent, vertical, horizontal, vertex, perpendicular distance, percentage, convert, equivalent, increase, decrease, reduce, multiplier, profit, loss, original, change, reverse, , depreciate, power, index,	Plan, front elevation, side elevation, perspective, isometric, solid, area, perpendicular, height, formulae, compound, acute, obtuse, reflex, right-angle, estimate, protractor, scale, ratio, multiplier, locus, path, equidistant, construction lines, point, arc, bisector, line segment, congruent,

		Percentage, outcomes, set, probability, chance, event, equally likely, unbiased, P(event), convert, equivalent, increase, decrease, reduce, multiplier, profit, loss, original, change, increase, decrease, reverse, depreciate, power, index	prism, compound, measurement, polygon, cuboid, volume, vertices, edge, face, units, conversion, diameter, radius, chord, circumference, Ratio, equal parts, proportion, relationship, divide, proportional, multiply, multiplier, share, factors, equivalent, divide, simplify, common factors, scale, compare, perimeter, circumference, constant, pi, regular, diameter, gradient, slope, steep, linear, variable, axes, conversion, approximation, exchange rate, currency, estimate, sterling, rate, directly proportional			
	Development of cultural capital	Ensure that all pupils can apply all four operations to any problem so that they can confidently apply all skills to functional and "real-life" mathematical problems.	Sequences link to real-life situations including production lines, architecture and quantity surveying as well as traffic flow modelling.	Pupils develop the skills and understanding use to calculate with proportionality. Real life applications include recipes. Real-life graphs expose pupils to distance-time graphs that have real-world applications.	Scientists use standard form when working with the speed of light and distances between galaxies, which can be enormous. The size of bacteria may also be referred to in standard form as they are so tiny.	Plans and elevations are needed in constructions, building and quantity surveying. An elevation drawing is an orthographic projection drawing that shows one side of the house. The purpose of an elevation drawing is to show the finished appearance of a given side of a house and furnish vertical height dimensions.	Real-life links can be made to data analysts and market research.
	Development of reading	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.
	Concepts –what will students be able to do at the end of the topic	**Rounding, estimating and bounds** ➢ Estimate answers ➢ Check calculations using approximation and estimation ➢ Apply systematic listing strategies including use of the product rule ➢ Apply and interpret limits of accuracy including upper and lower bounds ➢ Use inequality notation to specify simple error intervals due to truncation or rounding **Percentages** ➢ Solve problems involving percentage change ➢ percentage increase/decrease problems ➢ original value problems ➢ simple interest, including in financial mathematics **Angles, scale diagrams and Bearings** ➢ Apply the properties of: angles at a point, angles at	**Collecting and Representing data including scatter graphs** ➢ Interpret and construct tables, charts and diagrams, including: frequency tables, bar charts, pie charts and pictograms for categorical data ➢ Construct and interpret diagrams for grouped discrete data and continuous data, ie histograms with equal and unequal class intervals and cumulative frequency graphs ➢ Construct box plots ➢ tables and line graphs for time series data ➢ Use and interpret scatter graphs of bivariate data ➢ Recognise correlation and know that it does not indicate causation ➢ Draw estimated lines of best fit	**Indices** ➢ Estimate powers and roots of any given positive number ➢ Calculate with roots, and with integer and fractional indices **Surds** ➢ Calculate exactly with surds ➢ Simplify surd expressions involving squares (eg $\sqrt{12} = \sqrt{4 \times 3} = \sqrt{4} \times \sqrt{3} = 2\sqrt{3}$) and rationalise denominators ➢ Recognise and use simple geometric progressions (r^n where n is an integer and r is a surd) **Probability** ➢ Relate relative expected frequencies to theoretical probability, using appropriate language and the $0 - 1$ probability scale ➢ Enumerate sets and combinations of sets systematically, using	**2D Representations** ➢ Construct and interpret plans and elevations of 3D shapes **Transformations and Vectors** ➢ Identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection, translation and enlargement including fractional and negative scale factors ➢ Describe translations as 2D vectors ➢ Describe the changes and invariance achieved by combinations of rotations, reflections and translations ➢ Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and	**Congruence and Similarity** ➢ Use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS) ➢ Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, and use known results to obtain simple proofs ➢ Apply and use the concepts of congruence and similarity, including the relationships between lengths, areas and volumes in similar figures **Equation of a Circle** ➢ Recognise and use the equation of a circle with centre at the origin ➢ Find the equation of a tangent to a circle at a given point	**Pythagoras and Basic Trigonometry within right angled triangles** ➢ Know the formula for Pythagoras' Theorem $a2 + b2 = c2$ and the trigonometric ratios ➢ Apply them to find angles and lengths in right angled triangles and, where possible, general triangles in two and three dimensional figures ➢ Know the exact values of $\sin \theta$ and $\cos \theta$ for $\theta = 0^0$, 30^0, 45^0, 60^0 and 90^0 ➢ Know the exact value of $\tan \theta$ for 0^0, 30^0, 45^0, 60^0 **Higher Trigonometry** ➢ Know and apply the Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ and cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$ to find unknown lengths and angles Know and apply Area $= \frac{1}{2} ab\sin C$ to calculate the area, sides or angles of any triangle

a point on a straight line, vertically opposite angles
➢ Understand and use alternate and corresponding angles on parallel lines
➢ Use scale factors, scale diagrams and maps
➢ Use scale factors, scale diagrams and maps

Algebra: Quadratics, rearranging formulae and Identities
➢ Expanding products of two or more binomials
➢ Factorising quadratic expressions of the form $x^2 + bx + c$ including the difference of two squares
➢ Factorising quadratic expressions of the form $ax^2 + bx + c$
➢ Simplifying expressions involving sums, products and powers, including the laws of indices
➢ Rearrange formulae to change the subject
➢ Know the difference between an equation and an identity
➢ Use algebra to support and construct arguments and proofs
➢ Interpret the reverse process as the 'inverse function'
➢ Interpret the succession of two functions as a 'composite function'

Sequences
➢ Generate terms of a sequence from either a term-to-term or a position-to-term rule
➢ Recognise and use: triangular, square and cube numbers, simple arithmetic progression, Fibonacci-type sequences, quadratic sequences and simple geometric progressions (r^n where n is an integer and r is a rational number > 0)
➢ Deduce expressions to calculate the nth term of linear and quadratic sequences

Perimeter, Area and Circumference including circles and sectors
➢ Calculate the perimeters of 2D shapes including circles and composite shapes
➢ Calculate areas of circles and composite shapes
➢ Calculate surface area of spheres, cones and composite solids
➢ Calculate arc lengths, angles and areas of sectors of circles

Coordinates and Linear Graphs
➢ Plot graphs of equations that correspond to straight-line graphs in the coordinate plane.
➢ Use the form y = mx + c to identify parallel and perpendicular lines
➢ Find the equation of the line through two given points, or through one point with a given gradient
➢ Identify and interpret gradients and intercepts of linear functions graphically and algebraically

Real Life Graphs
➢ Plot and interpret graphs (including reciprocal graphs and exponential graphs) and graphs of non-standard functions.

Properties of Polygons
➢ Derive and use the sum of angles in a triangle (eg to deduce and use the angle sum in any polygon, and to derive properties of regular polygons)

tables, grids, Venn diagrams and tree diagrams
➢ Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions
➢ Calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams

Standard Form
➢ Understand and use place value (eg when working with very large or very small numbers)
➢ Calculate with and interpret standard from A x 10^n where $1 \le A < 10$ and n is an integer

Measures
➢ Apply and interpret limits of accuracy including upper and lower bounds
➢ Use compound units such as speed, rates of pay, unit pricing, density and pressure

diagrammatic and column representation of vectors
➢ Use vectors to construct geometric arguments and proofs

Further Equations and Graphs
➢ Solve linear equations in one unknown algebraically (including those with the unknown on both sides of the equation)
➢ Find approximate solutions using a graph
➢ Solve quadratic equations (including those that require rearrangement) algebraically by factorising, by completing the square and by using the quadratic formula
➢ Find approximate solutions using a graph
➢ Recognise, sketch and interpret graphs of linear and quadratic functions
➢ Identify and interpret roots, intercepts and turning points of quadratic functions graphically
➢ Deduce roots algebraically
➢ Deduce turning points by completing the square
➢ Derive an equation, solve the equation and interpret the solution

Numerical Methods
➢ Find approximate solutions to equations numerically using iteration including the use of suffix notation

Construction and Loci
➢ use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle
➢ Use these to construct given figures and solve loci problems

Simultaneous Equations
➢ Solve two simultaneous equations in two variables (linear/linear or linear/quadratic) algebraically
➢ Find approximate solutions using a graph
➢ Derive an equation (or two simultaneous equations), solve the equations and interpret the solution

Knowledge organisers		Rounding, estimating and bounds Percentages Angles, scale diagrams and Bearings Algebra: Quadratics, rearranging formulae and Identities Sequences	Collecting and Representing data Perimeter and Circumference Area including circles and sectors Coordinates and Linear Graphs Real Life Graphs Properties of Polygons	Indices Surds Probability Standard Form Measures	2D Representations Transformations and Vectors Further Equations and Graphs Numerical Methods	Congruence and Similarity Equation of a Circle Construction and Loci	Pythagoras Basic Trigonometry Higher Trigonometry Simultaneous Equations
Year Group		**Autumn Term 1**	**Autumn Term 2**	**Spring Term 1**	**Spring Term 2**		
Year 11 Foundation	**Topic**						
	Core knowledge from this topic	Algebra: Quadratics, Rearranging Formulae and Identities Volume Probability Simultaneous Equations Vectors Trigonometry	Algebra and Graphs Sketching Graphs Direct and Inverse Proportion Solving Quadratic Equations	Quadratic Graphs Growth and Decay Revision	Revision		
	Links to the national curriculum (if applicable)	P2, P3, P5, P6, P8, P9, R12, G16, G17, N8, A4, A5, A6, A7, S6	A16, A17, A18, A12, A11, A19, A21, A12, R10, R13, R14	A22, G20, G21, G6, R12, R16, G25, A13			
	Previous content that this topic builds upon	Students need to be able to convert between fractions, decimals and percentages. It is likely that students will be familiar with basic probability ideas from Key Stage 3, but they can access the materials in this topic without any prior knowledge. How to multiply a single term over a bracket. How to factorise a linear expression. How to collect like terms. How to calculate area and perimeter of rectangles or compound shapes made up of rectangles. Students will hopefully have seen the skill of substitution before but might need a recap. How to and why you can simplify a fraction.	Students should be able to use inequality signs between numbers. Students should be able to use negative numbers with the four operations, recall and use the hierarchy of operations and understand inverse operations. Students should be able to deal with decimals and negatives on a calculator. Students should be able to use index laws numerically. Students should be able to draw a number line.	Students should be able to plot coordinates and read scales Students should be able to substitute into a formula. Students should be able to square negative numbers. Students should be able to substitute into formulae. Students should be able to plot points on a coordinate grid. Students should be able to expand single brackets and collect 'like' terms Students should be able to rearrange simple formulae and equations, as preparation for rearranging trigonometric formulae. Students should recall basic angle facts. Students should understand when to leave an answer in surd form. Students can plot coordinates in all four quadrants and draw axes.			
	Key vocabulary	Probability, dependent, independent, conditional, outcomes, theoretical, relative frequency, fairness, experimental, rectangle, parallelogram, trapezium, area, perimeter, prism, compound, measurement, polygon, cuboid, volume, symmetry, vertices, edge, face, units, conversion volume, circle, segment, arc, sector, cylinder, circumference, radius, diameter, pi,	Quadratic, function, solve, expand, factorise, simplify, expression, graph, curve, factor, coefficient, bracket, Reciprocal, linear, gradient, direct, indirect, estimate, cubic, subject, rearrange, simultaneous, substitution, elimination,	Ratio, proportion, share, parts, fraction, function, direct proportion, inverse proportion, graphical, linear, compare, Triangle, right angle, angle, Pythagoras' Theorem, sine, cosine, tan, trigonometry, opposite, hypotenuse, adjacent, ratio, elevation, depression, length, accuracy, compound interest, growth, decay, depreciation, multiplier, Vector, direction, magnitude, scalar, multiple, parallel, collinear, ratio, column vector,			

Development of cultural capital	Ensure that all pupils can apply all four operations to any problem so that they can confidently apply all skills to functional and "real-life" mathematical problems.	Many positions that fall under the umbrella term of management use Pythagoras' Theorem regularly. Computer and information systems managers, construction managers, engineering and natural sciences managers use this in their day-to-day business of their respective fields.	Astronomers use trigonometry to calculate how far stars and planets are from Earth, even though we know the distances between planets and stars, this mathematical technique is also used by NASA scientist today when they design and launch space shuttles and rockets.			
Development of reading	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.		
Concepts –what will students be able to do at the end of the topic	Algebra: Quadratics, Rearranging Formulae and Identities ➢ Simplify and manipulate algebraic expressions (including those involving surds) by: – simplifying expressions involving sums, products and powers, including the laws of indices – expanding products of two binomials – factorising quadratic expressions of the form $x2 + bx + c$ including the difference of two squares ➢ Rearrange formulae to change the subject ➢ Know the difference between an equation and an identity ➢ Argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments Volume ➢ Compare lengths, areas and volumes using ratio notation ➢ Scale factors ➢ Make links to similarity ➢ Know and apply formulae to calculate the volume of cuboids and other right prisms (including cylinders) ➢ Calculate the volume of spheres, pyramids, cones and composite solids ➢ Calculate exactly with multiples of π Probability ➢ Apply ideas of randomness, fairness and	Algebra and Graphs ➢ Solve linear equations in one unknown algebraically ➢ Including those with the unknown on both sides of the equation ➢ Find approximate solutions using a graph ➢ Translate simple situations or procedures into algebraic expressions or formulae ➢ Derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution Sketching Graphs ➢ Recognise, sketch and interpret graphs of linear functions, quadratic functions ➢ Simple cubic functions and the reciprocal function $y = \frac{1}{x}$ with $x \neq 0$ Direct and Inverse Proportion ➢ Solve problems involving direct and inverse proportion, including graphical and algebraic representations ➢ Understand that X is inversely proportional to Y is equivalent to X is proportional to $\frac{1}{Y}$ ➢ Interpret equations that describe direct and inverse proportion ➢ Recognise and interpret graphs that illustrate direct and inverse proportion	Quadratic Graphs ➢ Recognise, sketch and interpret graphs of quadratic functions ➢ Identify and interpret roots, intercepts and turning points of quadratic functions graphically ➢ Deduce roots algebraically Growth and Decay ➢ Set up, solve and interpret the answers in growth and decay problems, including compound interest Revision			

equally likely events to calculate expected outcomes or multiple future experiments
➢ Relate relative expected frequencies to theoretical probability, using appropriate language and the 0 to 1 probability scale
➢ Understand that empirical unbiased samples tend towards theoretical probability distributions with increasing sample size
➢ Enumerate sets and combinations of sets systematically using tables, grids, Venn diagrams and tree diagrams
➢ Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions

Simultaneous Equations
➢ Solve two simultaneous equations in two variables (linear/linear) algebraically
➢ Find approximate solutions using a graph
➢ Translate simple situations or procedures into algebraic expressions or formulae
➢ Derive two simultaneous equations, solve the equations and interpret the solution

Vectors
➢ Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representation of vectors

Basic Trigonometry
➢ Know and use the trigonometric ratios
$\sin \theta = \frac{opposite}{hypotenuse}$, $\cos \theta = \frac{adjacent}{hypotenuse}$, $\tan$
➢ Apply them to find angles and lengths in right-angled triangles in two dimensional figures

Solving Quadratic Equations
➢ Solve quadratic equations algebraically by factorising
➢ Find approximate solutions using a graph

		➤ Know the exact values of $\sin\vartheta$ and $\cos\vartheta$ for $\vartheta = 0^0$, 30^0, 45^0, 60^0 and 90^0 ➤ Know the exact value of $\tan\vartheta$ for $\vartheta = 0^0$, 30^0, 45^0, 60^0				
	Knowledge organisers	Algebra: Quadratics, Rearranging Formulae and Identities Volume Probability Simultaneous Equations Vectors Trigonometry	Algebra and Graphs Sketching Graphs Direct and Inverse Proportion Solving Quadratic Equations	Quadratic Graphs Growth and Decay Revision		
Year Group		Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	
Year 11 Higher	Topic					
	Core knowledge from this topic	Further Equations and Graphs Volume Sketching Graphs Numerical Methods Simultaneous Equations Circle Theorems	Sine and Cosine Rule Direct and Inverse Proportion Inequalities Growth and Decay Vectors Transforming Functions Algebraic Fractions	Gradient and Rates of change Pre-Calculus and Area Under a Curve Revision	Revision	
	Links to the national curriculum (if applicable)	R12, G16, G17, N8, A4, A5, A6, A7, S6, N20, G10, A19, A21	A16, A17, A18, A12, A11, A12, R10, R13, R14, G22, G23, A22, G20, G21, G6, R12, R16, G25, A13	A15, R14 and R15		
	Previous content that this topic builds upon	Students need to be able to convert between fractions, decimals and percentages. It is likely that students will be familiar with basic probability ideas from Key Stage 3, but they can access the materials in this topic without any prior knowledge. How to multiply a single term over a bracket. How to factorise a linear expression. How to collect like terms. How to calculate area and perimeter of rectangles or compound shapes made up of rectangles. Students will hopefully have seen the skill of substitution before but might need a recap. How to and why you can simplify a fraction.	Students should be able to use inequality signs between numbers. Students should be able to use negative numbers with the four operations, recall and use the hierarchy of operations and understand inverse operations. Students should be able to deal with decimals and negatives on a calculator. Students should be able to use index laws numerically. Students should be able to draw a number line.	Students should be able to plot coordinates and read scales Students should be able to substitute into a formula. Students should be able to square negative numbers. Students should be able to substitute into formulae. Students should be able to plot points on a coordinate grid. Students should be able to expand single brackets and collect 'like' terms Students should be able to rearrange simple formulae and equations, as preparation for rearranging trigonometric formulae. Students should recall basic angle facts. Students should understand when to leave an answer in surd form. Students can plot coordinates in all four quadrants and draw axes.		
	Key vocabulary	Probability, dependent, independent, conditional, outcomes, theoretical, relative frequency, experimental, Triangle, rectangle, parallelogram, trapezium, area, perimeter, formula, , prism, compound, measurement, polygon, cuboid, volume, symmetry, vertices, edge, face, units, conversion, circle, segment, arc, sector, cylinder,	solve, inequality, represent, substitute, linear, accuracy, Triangle, right angle, angle, Pythagoras' Theorem, sine, cosine, tan, trigonometry, opposite, hypotenuse, adjacent, ratio, elevation, depression, length, accuracy, rearrange, simultaneous, substitution, elimination,	Ratio, proportion, share, parts, fraction, function, direct proportion, inverse proportion, graphical, linear, compare, triangle, right angle, angle, Pythagoras' Theorem, sine, cosine, tan, trigonometry, opposite, hypotenuse, adjacent, ratio, elevation, depression, length, accuracy, Compound interest, growth, decay, depreciation,		

	circumference, radius, diameter, pi, sphere, cone, hemisphere, segment, accuracy, surface area, subject, rearrange, simultaneous, substitution, elimination,			multiplier, Vector, direction, magnitude, scalar, multiple, parallel, collinear, ratio, column vector, Quadratic, function, solve, expand, factorise, simplify, expression, graph, curve, factor, coefficient, bracket, Reciprocal, linear, gradient, direct, indirect, estimate, cubic		
Development of cultural capital	Ensure that all pupils can apply all four operations to any problem so that they can confidently apply all skills to functional and "real-life" mathematical problems.	Many positions that fall under the umbrella term of management use Pythagoras' Theorem regularly. Computer and information systems managers, construction managers, engineering and natural sciences managers use this in their day-to-day business of their respective fields.	Astronomers use trigonometry to calculate how far stars and planets are from Earth, even though we know the distances between planets and stars, this mathematical technique is also used by NASA scientist today when they design and launch space shuttles and rockets.			
Development of reading	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.	Guided Reading and problem style exam questions linked to explaining and articulating their reasoning.		
Concepts –what will students be able to do at the end of the topic	Further Equations and Graphs ➢ Solve linear equations in one unknown algebraically (including those with the unknown on both sides of the equation) ➢ Find approximate solutions using a graph ➢ Solve quadratic equations (including those that require rearrangement) algebraically by factorising, by completing the square and by using the quadratic formula ➢ Find approximate solutions using a graph ➢ Recognise, sketch and interpret graphs of linear and quadratic functions ➢ Identify and interpret roots, intercepts and turning points of quadratic functions graphically ➢ Deduce roots algebraically ➢ Deduce turning points by completing the square ➢ Translate simple situations or procedures into algebraic expressions or formulae ➢ Derive an equation, solve the equation and interpret the solution Volume ➢ Compare lengths, areas and volumes using ratio notation	Sine and Cosine Rule ➢ Know and apply the Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ and cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$ to find unknown lengths and angles Know and apply $\text{Area} = \frac{1}{2}ab\sin C$ to calculate the area, sides or angles of any triangle Direct and Inverse Proportion ➢ Solve problems involving direct and inverse proportion, including graphical and algebraic representations ➢ Understand that X is inversely proportional to Y is equivalent to X is proportional to $\frac{1}{Y}$ ➢ Construct and interpret equations that describe direct and inverse proportion ➢ Recognise and interpret graphs that illustrate direct and inverse proportion Inequalities ➢ Solve linear inequalities in one or two variable(s) and quadratic inequalities in one variable ➢ Represent the solution set on a number line, using	Gradient and Rates of change ➢ Interpret the gradient at a point on a curve as the instantaneous rate of change ➢ Apply the concepts of average and instantaneous rates of change (gradients of chords and tangents) in numerical, algebraic and graphical contexts ➢ Interpret the gradient of a straight-line graph as a rate of change Pre-Calculus and Area Under a Curve ➢ Calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear graphs) ➢ Interpret the results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts Revision			

➢ Scale factors
➢ Make links to similarity
➢ Know and apply the formulae to calculate volume of cuboids and other right prisms (including cylinders)
➢ Calculate the volume of spheres, pyramids, cones and composite solids
➢ Calculate exactly with multiples of π

Sketching Graphs
➢ Recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions, and the reciprocal function $y = \frac{1}{x}$ for $x \neq 0$, exponential functions $y = kx$ for positive values of k, and the trigonometric functions (with arguments in degrees) $y = \sin x$, $y = \cos x$ and $y = \tan x$ for angles of any size

Numerical Methods
➢ Find approximate solutions to equations numerically using iteration including the use of suffix notation

Simultaneous Equations
➢ Solve two simultaneous equations in two variables (linear/linear or linear/ quadratic) algebraically
➢ Find approximate solutions using a graph
➢ Translate simple situations or procedures into algebraic expressions or formulae
➢ Derive an equation (or two simultaneous equations), solve the equations and interpret the solution

Circle Theorems
➢ Apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results

set notation and on a graph

Growth and Decay
➢ Set up, solve and interpret the answers in growth and decay problems, including compound interest and work with general iterative processes

Vectors
➢ Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representation of vectors
➢ Use vectors to construct geometric arguments and proofs

Transforming Functions
➢ Sketch translations and reflections of a given function

Algebraic Fractions
➢ Simplify and manipulate algebraic expressions involving algebraic fractions

	Knowledge organisers	Further Equations and Graphs Volume	Sine and Cosine Rule Direct and Inverse Proportion	Gradient and Rates of change	Revision		

		Sketching Graphs Numerical Methods Simultaneous Equations Circle Theorems	Inequalities Growth and Decay Vectors Transforming Functions Algebraic Fractions	Pre-Calculus and Area Under a Curve Revision		