

Higher Year 10 Scheme of Work

Key: *Italic specification references are assumed prior knowledge and are covered in the prior knowledge check rather than the main teaching.*

Term	Unit/section title	Prior knowledge	GCSE (9-1) Specification reference
A u t u m t e r m	1 Number <i>(Edexcel Scheme of Work Unit 1: Powers, decimals, HCF and LCM, positive and negative, roots, rounding, reciprocals, standard form, indices and surds)</i>	<p>Students should have a firm grasp of place value and be able to order integers and decimals and use the four operations.</p> <p>Students should have knowledge of integer complements to 10 and to 100, multiplication facts to 10×10, strategies for multiplying and dividing by 10, 100 and 1000.</p> <p>Students will have encountered squares, square roots, cubes and cube roots and have knowledge of classifying integers.</p>	<p><i>N2 apply the four operations, including formal written methods, to integers, decimals ... both positive and negative; understand and use place value (e.g. working with very large or very small numbers, and when calculating with decimals)</i></p> <p><i>N3 recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions); use conventional notation for priority of operations, including brackets, powers, roots and reciprocals</i></p> <p><i>N4 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</i></p> <p><i>N5 apply systematic listing strategies including use of the product rule for counting (i.e. if there are m ways of doing one task and for each of these, there are n ways of doing another task, then the total number of ways the two tasks can be done is $m \times n$ ways)</i></p> <p><i>N6 use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5; estimate powers and roots of any given positive number</i></p> <p><i>N7 calculate with roots and with integer and fractional indices</i></p> <p><i>N8 calculate exactly with ... surds; ... simplify surd expressions involving squares (e.g. $\sqrt{12} = \sqrt{(4 \times 3)} = \sqrt{4} \times \sqrt{3} = 2\sqrt{3}$)</i></p> <p><i>N9 calculate with and interpret standard form $A \times 10^n$, where $1 \leq A < 10$ and n is an integer.</i></p> <p><i>N14 estimate answers; check calculations using approximation and estimation, including answers obtained using technology</i></p> <p><i>N15 round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures); ...</i></p>
	2 Algebra <i>(Edexcel Scheme of Work Unit 2: Expressions, substituting into simple formulae, expanding and factorising, equations, sequences and inequalities, simple proof)</i>	<p>Students should have prior knowledge of some of these topics, as they are encountered at Key Stage 3:</p> <ul style="list-style-type: none"> • the ability to use negative numbers with the four operations and recall and use hierarchy of operations and understand inverse operations; • dealing with decimals and negatives on a calculator; • using index laws numerically. <p>Students should be able to use and interpret algebraic notation.</p> <p>Students should be able to set up and solve simple equations.</p> <p>Students should recall the definitions of geometric and arithmetic sequences.</p>	<p><i>N1 ... use the symbols =, ≠, <, >, ≤, ≥</i></p> <p><i>N3 recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions); use conventional notation for priority of operations, including brackets, powers, roots and reciprocals</i></p> <p><i>N8 calculate exactly with fractions ...</i></p> <p><i>N9 calculate with and interpret standard form $A \times 10^n$, where $1 \leq A < 10$ and n is an integer.</i></p> <p><i>A1 use and interpret algebraic notation, including:</i></p> <ul style="list-style-type: none"> • <i>ab in place of $a \times b$</i> • <i>3y in place of $y + y + y$ and $3 \times y$</i> • <i>a^2 in place of $a \times a$, a^3 in place of $a \times a \times a$, a^2b in place of $a \times a \times b$</i> • <i>in place of $a \div b$</i> • <i>coefficients written as fractions rather than as decimals</i> • <i>brackets</i> <p><i>A2 substitute numerical values into formulae and expressions, including scientific formulae</i></p> <p><i>A3 understand and use the concepts and vocabulary of expressions, equations, formulae, identities,</i></p>

		<p>inequalities, terms and factors</p> <p>A4 simplify and manipulate algebraic expressions ... by:</p> <ul style="list-style-type: none"> • collecting like terms • multiplying a single term over a bracket • taking out common factors • expanding products of two ... binomials • factorising quadratic expressions of the form $x^2 + bx + c$, including the difference of two squares; ... • simplifying expressions involving sums, products and powers, including the laws of indices <p>A5 understand and use standard mathematical formulae; rearrange formulae to change the subject</p> <p>A6 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 and proofs</p> <p>A7 where appropriate, interpret simple expressions as functions with inputs and outputs; ...</p> <p>A17 solve linear equations in one unknown algebraically ...;</p> <p>A21 translate simple situations or procedures into algebraic expressions or formulae; derive an equation ..., solve the equation and interpret the solution</p> <p>A22 solve linear inequalities in one or two variable(s), and quadratic inequalities in one variable; represent the solution set on a number line, using set notation and on a graph</p> <p>A23 generate terms of a sequence from either a term-to-term or a position-to-term rule</p> <p>A24 recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions, Fibonacci type sequences and simple geometric progressions (rn where n is an integer, and r is a rational number > 0), recognise and use other sequences or a surd)</p> <p>A25 deduce expressions to calculate the nth term of linear sequences.</p>
<p>3 Interpreting and representing data</p> <p><i>(Edexcel Scheme of Work Unit 3: Averages and range, collecting data, representing data)</i></p>	<p>Students should be able to read scales on graphs, draw circles, measure angles and plot coordinates in the first quadrant.</p> <p>Students should have experience of tally charts.</p> <p>Students will have used inequality notation.</p> <p>Students must be able to find midpoint of two numbers.</p> <p>Students should be able to find the range, mean, median and mode of a data set.</p>	<p><i>G14 use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)</i></p> <p>S1 infer properties of populations or distributions from a sample, while knowing the limitations of sampling</p> <p>S2 interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, tables and line graphs for time series data and know their appropriate use</p> <p>S3 construct and interpret diagrams for grouped discrete data and continuous data i.e. histograms with equal and unequal class intervals ...</p> <p>S4 interpret, analyse and compare the distributions of data sets from univariate empirical distributions through:</p> <ul style="list-style-type: none"> • appropriate graphical representation involving discrete, continuous and grouped data ... • appropriate measures of central tendency (median, mode and modal class) and spread (range, including consideration of outliers) ... <p>S5 apply statistics to describe a population</p> <p>S6 use and interpret scatter graphs of bivariate data; recognise correlation and know that it does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing</p>

<p>4 Fractions, ratio and percentages</p> <p><i>(Edexcel Scheme of Work Unit 4: Fractions, percentages, ratio and proportion)</i></p>	<p>Students should know the four operations of number. Students should be able to find common factors. Students should have a basic understanding of fractions as being 'parts of a whole'. Students can define percentage as 'number of parts per hundred'. Students are aware that percentages are used in everyday life. Students should be able use ratio notation, and to write a ratio in its simplest form</p>	<p>N2 apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative; ... N3 recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions); use conventional notation for priority of operations, including brackets, powers, roots and reciprocals N8 calculate exactly with fractions ... N10 work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 0.375 and $\frac{1}{3}$); change recurring decimals into their corresponding fractions and vice versa N11 identify and work with fractions in ratio problems N12 interpret fractions and percentages as operators N13 use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate R3 express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1 R4 use ratio notation, including reduction to simplest form R5 divide a given quantity into two parts in a given part:part or whole:part ratio; 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, concentrations) R6 express a multiplicative relationship between two quantities as a ratio or a fraction R7 understand and use proportion as equality of ratios R8 relate ratios to fractions and to linear functions R9 define percentage as 'number of parts per hundred'; interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively; express one quantity as a percentage of another; compare two quantities using percentages; work with percentages greater than 100%; solve problems involving percentage change, including percentage increase/decrease, and original value problems and simple interest including in financial mathematics R10 solve problems involving direct proportion; ...</p>
<p>5 Angles and trigonometry</p> <p><i>(Edexcel Scheme of Work Unit 5: Angles, polygons, parallel lines; Right-angled triangles: Pythagoras and trigonometry)</i></p>	<p>Students should be able to rearrange simple formulae and equations, as preparation for rearranging trig formulae. Students should recall basic angle facts. Students should understand that fractions are more accurate in calculations than rounded percentage or decimal equivalents. Students should recall the properties of special types of triangles and quadrilaterals.</p>	<p>N7 Calculate with roots and with integer and fractional indices N8 calculate exactly with fractions and surds ... N15 round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures); ... G1 use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries; ... G3 ... understand and use alternate and corresponding angles on parallel lines; derive and use the sum of angles in a triangle (e.g. to deduce and use the angle sum in any polygon, and to derive properties of regular polygons) G4 derive and apply the properties and definitions of: special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus; ... G6 apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including Pythagoras' theorem and the fact that the base angles of an isosceles triangle are equal, and use known results to obtain simple proofs G20 know the formulae for: Pythagoras' theorem $a^2 + b^2 = c^2$, and the trigonometric ratios sine, cosine and tan; apply them to find angles and lengths in right-angled triangles ... and in two dimensional figures G21 know the exact values of $\sin \theta$ and $\cos \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90°; know the exact value of $\tan \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ and 60°</p>

End of term test

<p>S p r i n g t e r m</p>	<p>6 Graphs</p> <p><i>(Edexcel Scheme of Work Unit 6: Real-life and algebraic linear graphs, quadratic and cubic graphs, the equation of a circle, plus rates of change and area under graphs made from straight lines)</i></p>	<p>Students should be able to identify coordinates of given points in the first quadrant or all four quadrants.</p> <p>Students should be able to write the equation for a straight line graph.</p> <p>Students should be able to use and draw conversion graphs.</p> <p>Students should be able to use function machines and inverse operations.</p> <p>Students should be able to use compound units, such a speed.</p>	<p><i>N13 use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate</i></p> <p>A8 work with coordinates in all four quadrants</p> <p>A9 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</p> <p>A10 identify and interpret gradients and intercepts of linear functions graphically and algebraically</p> <p>A11 identify and interpret roots, intercepts, turning points of quadratic functions graphically; ...</p> <p>A12 recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions, the reciprocal function $y = 1/x$ with $x \neq 0$, ...</p> <p>A14 plot and interpret ... graphs of non-standard functions in real contexts to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration</p> <p>A15 calculate or estimate gradients of graphs and areas under graphs (including quadratic and non-linear graphs) and interpret results in cases such as distance–time graphs, velocity–time graphs ... (this does not include calculus)</p> <p>A16 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</p> <p>A17 solve linear equations in one unknown ... (including those with the unknown on both sides of the equation); find approximate solutions using a graph</p> <p>G11 solve geometrical problems on coordinate axes</p> <p>R8 relate ratios to fractions and to linear functions</p> <p>R10 solve problems involving direct ... proportion, including graphical ... representations</p> <p>R11 use compound units such as speed, ... unit pricing, ...</p>
	<p>7 Area and volume</p> <p><i>(Edexcel Scheme of Work Unit 7: Perimeter, area and volume, plane shapes and prisms, circles, cylinders, spheres, cones; Accuracy and bounds)</i></p>	<p>Students should know the names and properties of 3D shapes.</p> <p>The concept of perimeter and area by measuring lengths of sides will be familiar to students.</p> <p>Students should be able to substitute numbers into an equation and give answers to an appropriate degree of accuracy.</p> <p>Students should know the various metric units.</p> <p>Students should be able to identify planes of symmetry of 3D solids.</p> <p>Students should be able to sketch a net of a 3D shape.</p> <p>Students should be able to work out the volume of a 3D solid made of cuboids.</p> <p>Students should recall Pythagoras' theorem.</p>	<p>N8 calculate exactly with ... multiples of π; ...</p> <p>N13 use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate</p> <p>N14 estimate answers; check calculations using approximation and estimation, including answers obtained using technology</p> <p>N15 round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures); use inequality notation to specify simple error intervals due to truncation or rounding</p> <p>N16 apply and interpret limits of accuracy, including upper and lower bounds</p> <p>R1 change freely between related standard units (e.g. time, length, area, volume/capacity, mass) ... in numerical and algebraic contexts</p> <p><i>G1 use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries; ...</i></p> <p>G9 identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment</p> <p><i>G12 identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres</i></p> <p>G14 use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc)</p> <p>G16 know and apply formulae to calculate: area of triangles, parallelograms, trapezia; volume of cuboids and other right prisms (including cylinders)</p> <p>G17 know the formulae: circumference of a circle = $2\pi r = \pi d$, area of a circle = πr^2; calculate: perimeters of 2D shapes, including circles; areas of circles and composite shapes; surface area and volume of spheres, pyramids, cones and composite solids</p> <p>G18 calculate arc lengths, angles and areas of sectors of circles</p>

<p>8 Transformations and constructions</p> <p><i>(Edexcel Scheme of Work Unit 8: Transformations; Constructions: triangles, nets, plan and elevation, loci, scale drawings and bearings)</i></p>	<p>Students should be able to recognise 2D shapes. Students should be able to plot coordinates in four quadrants and linear equations parallel to the coordinate axes. Students should be able to convert metric measures. Students should be able to recognise congruent and similar shapes. Students should be able to transform shapes using translation, reflection, rotation and enlargement.</p>	<p>R2 use scale factors, scale diagrams and maps R6 express a multiplicative relationship between two quantities as a ratio or a fraction G1 ... draw diagrams from written description G2 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; know that the perpendicular distance from a point to a line is the shortest distance to the line G7 identify, describe and construct congruent and similar shapes, including on a coordinate axis, by considering rotation, reflection, translation and enlargement (including fractional and negative scale factors) G8 describe the changes and invariance achieved by combinations of rotations, reflections and translations G12 identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres G13 construct and interpret plans and elevations of 3D shapes G15 measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings G24 describe translations as 2D vectors G25 apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors; ...</p>
<p>9 Equations and inequalities</p> <p><i>(Edexcel Scheme of Work Unit 9: Algebra: Solving quadratic equations and inequalities, solving simultaneous equations algebraically)</i></p>	<p>Students should understand the \geq and \leq symbols. Students can substitute into, solve and rearrange linear equations. Students should be able to factorise simple quadratic expressions. Students should be able to recognise the equation of a circle.</p>	<p>N1 order positive and negative integers, decimals and fractions; use the symbols =, \neq, <, >, \leq, \geq N8 calculate exactly with ... surds; ... simplify surd expressions involving squares (e.g. $\sqrt{12} = \sqrt{4 \times 3} = \sqrt{4} \times \sqrt{3} = 2\sqrt{3}$) A3 understand and use the concepts and vocabulary of expressions, equations, formulae, identities, inequalities, terms and factors A4 simplify and manipulate algebraic expressions (including those involving surds ...) by: ... factorising quadratic expressions of the form $ax^2 + bx + c$ A5 understand and use standard mathematical formulae; rearrange formulae to change the subject A9 ... find the equation of the line through two given points, or through one point with a given gradient A11 identify and interpret roots ... of quadratic functions algebraically ... A18 solve quadratic equations (including those that require rearrangement) algebraically by factorising, by completing the square and by using the quadratic formula; ... A19 solve two simultaneous equations in two variables (linear/linear or linear/quadratic) algebraically; find approximate solutions using a graph A21 ... derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution. A22 solve linear inequalities in one or two variable(s), and quadratic inequalities in one variable; represent the solution set on a number line, using set notation and on a graph</p>

<p>10 Probability <i>(Edexcel Scheme of Work Unit 10: Probability)</i></p>	<p>Students should understand that a probability is a number between 0 and 1, and distinguish between events which are impossible, unlikely, even chance, likely, and certain to occur. Students should be able to mark events and/or probabilities on a probability scale of 0 to 1. Students should know how to add and multiply fractions and decimals. Students should have experience of expressing one number as a fraction of another number. Students should be able to list all outcomes for a single event systematically. Students should be able to make predictions from experimental data. Students should be able to complete a two-way table.</p>	<p>N5 apply systematic listing strategies, .. P1 record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees P2 apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments P3 relate relative expected frequencies to theoretical probability, using appropriate language and the 0–1 probability scale P4 apply the property that the probabilities of an exhaustive set of outcomes sum to one; apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one P5 understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size P6 enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams and tree diagrams P7 construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities P8 calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions P9 calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams</p>
End of term test		
<p>S u m m e r t e r m</p> <p>11 Multiplicative reasoning <i>(Edexcel Scheme of Work Unit 11: Multiplicative reasoning: direct and inverse proportion, relating to graph form for direct, compound measures, repeated proportional change)</i></p>	<p>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. Knowledge of speed = distance/time, density = mass/volume. Students should be able to convert between metric units. Students should be able to solve simple direct and indirect proportion problems, including currency conversion.</p>	<p>N12 interpret fractions and percentages as operators N13 use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate A2 substitute numerical values into formulae and expressions, including scientific formulae A9 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 R1 change freely between related standard units (e.g. time, length, area, volume/capacity, mass) and compound units (e.g. speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts R6 express a multiplicative relationship between two quantities as a ratio or a fraction R9 define percentage as 'number of parts per hundred'; interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively; express one quantity as a percentage of another; compare two quantities using percentages; work with percentages greater than 100%; solve problems involving percentage change, including percentage increase/decrease and original value problems, and simple interest including in financial mathematics R10 solve problems involving direct and inverse proportion, including graphical and algebraic representations R11 use compound units such as speed, rates of pay, unit pricing, density and pressure R13 understand that X is inversely proportional to Y is equivalent to X is proportional to $1/Y$; construct and interpret equations that describe direct and inverse proportion R14 ... recognise and interpret graphs that illustrate direct and inverse proportion R16 set up, solve and interpret the answers in growth and decay problems, including compound interest and work with general iterative processes</p>

<p>15 Equations and graphs</p> <p><i>(Edexcel Scheme of Work Unit 15: Quadratics, expanding more than two brackets, sketching graphs, graphs of circles, cubes and quadratics)</i></p>	<p>Students should be able to solve quadratics and linear equations. Students should be able to solve simultaneous equations algebraically.</p>	<p>N8 Calculate exactly with ... surds ... A4 simplify and manipulate algebraic expressions ... by: expanding products of two or more binomials A11 identify and interpret roots, intercepts, turning points of quadratic functions graphically; ... identify turning points by completing the square A12 recognise, sketch and interpret graphs of ... quadratic functions, simple cubic functions ... A18 solve quadratic equations (including those that require rearrangement) ...; find approximate solutions using a graph A19 solve two simultaneous equations in two variables (linear/linear or linear/quadratic) algebraically; find approximate solutions using a graph A20 find approximate solutions to equations numerically using iteration A21 ... derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution. A22 solve linear inequalities in one or two variable(s), and quadratic inequalities in one variable; represent the solution set on a number line, using set notation and on a graph</p>
End of year test		