

**Long Term Plan - Maths**

**Year 9 (Route two)**

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p><b>Key Themes:</b> Calculations and Expressions</p>	<p><b>Key Themes:</b> Angles and Polygons and Handling Data</p>	<p><b>Key Themes:</b> Fractions, Decimals and Percentages and Formulae and Functions</p>	<p><b>Key Themes:</b> Working with shape</p>	<p><b>Key Themes:</b> Probability, circles and constructions</p>	<p><b>Key Themes:</b> Surds</p>
<p><b>Key Concepts:</b> Students will have a strong understanding of methods of calculations in both calculator and non-calculator contexts. They will understand when to use each of the four operations in order to answer multi-step or real-life questions. They will understand the implied order of precedence when using multiple operations. They will be able to offer clear, logical solutions which explain each step of their method.</p>	<p><b>Key Concepts:</b> Students will have an understanding of the spatial properties of angles and turns. They will begin to appreciate the numerical significance of angles in polygons and the patterns and rules which govern them. They will learn the rules which allow the description of angles on parallel lines and the calculations of missing angles. This builds on KS3 work and allows students to access problem solving questions</p>	<p><b>Key Concepts:</b> Students will understand the equivalence of fractions, decimals &amp; percentages. Students will recognise that the same number can be expressed in different formats. Students will be comfortable with percentages representing proportions of the whole and in using percentages to compare changes in different numbers. Students will understand fractions as representations of</p>	<p><b>Key Concepts:</b> Students will become familiar with the concept of measurement and the limits of our ability to accurately measure. They will build on their skills in order to accurately draw and construct 2d shapes. Furthermore, they will build on their previous learning of transformations, which allows access to all transformation skills required for success at GCSE Mathematics. Pupils will build on their</p>	<p><b>Key Concepts:</b> To empower students with the requisite skills to understand the nature of randomness and to express the possibility of outcomes in a comparable, accurate manner. To build on prior knowledge of equal likelihood and to allow students to access advanced probability skills required for the remainder of the Mathematics curriculum and beyond.</p>	<p><b>Key Concepts:</b> Surds are the study of the exact – they allow students to explore infinite decimals in an understandable way. The study of surds bridges between algebra and number and their manipulation and simplification allows students to improve their mental mathematics skills. This builds upon KS3 understanding of powers and roots and forms an important basis of much KS4 trigonometry and of</p>

<p>This topic continues from Key Stage 2 Mathematics with added extension topics to challenge our more able students. Students will have developed knowledge of algebra and the representation of symbols in mathematics. Key skills from KS2 and developed during years 7 and 8 are essential preparation for the needs of the GCSE (9 – 1) curriculum. Students will be introduced to more complex calculations and will be challenged on their ability to balance and rearrange equations in a variety of contexts.</p>	<p>which combine angles with algebra and other numerical concepts. It will be regularly revisited via homework tasks and recall starters. Students will learn an array of techniques which allow them to concisely represent data. They will learn how to calculate summary statistics for discrete and continuous data and learn how to use these statistics to support or refute an argument. Students will learn to interpret primary and secondary data and use these interpretations to form opinions. Students will learn about the misrepresentation of data via incomplete or inaccurately labelled diagrams and will learn to</p>	<p>both integral and non-integral numbers &amp; of numbers larger than 1. Students will recognise decimals as a format of non-integral numbers. All three representations are used throughout mathematics in problem solving and will allow students to access topics such as standard form and solving equations. Students will gain familiarity with the correct algebraic notation to represent the four operations, indices and order of operations. This builds on work from previous year. These manipulations are critical for any further understanding throughout GCSE of algebra and allow success with equations and algebraic fractions.</p>	<p>knowledge of substitution, rearrangement and formulae to be able to fully explore 3d shapes</p>	<p>Students will build on their knowledge of mensuration of rectilinear shapes to calculate areas and lengths related to circles and circular arcs. Calculations involving circles occur throughout GCSE Maths. Students will build on their compass and spatial skills from KS3 in order to create complicated constructions. Angles in circles allow students to access natural geometric proofs.</p>	<p>further mathematical study.</p>
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	<p>assess the usefulness of both the data collected and the manner in which it is presented.</p>	<p>Further manipulation into roots allows a thorough understanding of quadratic graphs and study of changing the subject allows the most challenging GCSE questions to be understood.</p>			
<p><b>Links to prior learning:</b>  18.1 - Seen before: Taught in year 7 and developed through the use of estimation.  18.2 - Seen before: Taught in year 7 and prior. Constantly developed through the years  18.3 - Seen before: Taught in year 7 the early applications  18.4 - Seen before: Taught in year 7 the importance of understanding number.  19.1 - Seen before: Taught in year 7 and developed further over time</p>	<p><b>Links to prior learning:</b>  20.1 - Seen before: Taught in year 7 after initial topic visit in KS2  20.2 - Seen before: Taught in year 7 after initial topic visit in KS2  20.3 - Seen before: Bearing is a new topic not previously seen. However, use of protractor to measure is a prior knowledge skill.  20.4 - Seen before: Proof of congruence and similarity is a new topic, but foundations have</p>	<p><b>Links to prior learning:</b>  22.1 - Seen before: Seen in year 7 when studying initial percentages.  22.2 - Seen before: Algebra has been seen in year 7 and earlier in year 9.  Fractions have been seen in year 7 and developed over the period.  22.3 - Seen before: Seen converting between terminating decimals and fractions in year 7  23.1 - Seen before: Taught in year 7 after initial topic visit in</p>	<p><b>Links to prior learning:</b>  24.1 - Seen before: Taught in year 7 following on from 'simple' shapes in KS2  24.2 - Seen before: Taught in year 8 standard translation, rotations, reflections and enlargements.  24.3 - Seen before: Taught in year 8 after initial volume understanding in KS2</p>	<p><b>Links to prior learning:</b>  25.1 - Seen before: Taught in year 8 for the first time.  25.2 - Seen before: Taught in year 8 for the first time, we will use skills from algebra to develop further  26.1 - Seen before: Taught in year 8 for the first time and seen during DINs  26.2 - Seen before: New topic not previously studied. Will be using knowledge of angles and parts of circles throughout</p>	<p><b>Links to prior learning:</b>  27.1 - Seen before: You will have seen surds on a calculator display and when studying quadratic formula  27.2 - Seen before: This is a new topic not previously studied. Will require use of multiplication and expanding brackets</p>

<p>19.2 - Seen before: Taught in year 7 as part of the introduction to indices</p>	<p>been seen in year 8 with transformations 21.1 - Seen before: New topic not previously studied 21.2/21.3 - Seen before: Studied initially in year 8 with statistics unit</p>	<p>KS2 on solving equations 23.2 - Seen before: Taught in year 7 and extended earlier in year 9 with expanding and factorising single brackets 23.3 - Seen before: Requires the skills of algebra topics taught from year 7 up to now.</p>		<p>26.3 - Seen before: Taught constructing triangles in year 8 using protractors and compasses</p>	
<p><b>Vocabulary:</b> Place value, decimals, measures, integers, positive, negative, fractions, real numbers, prime numbers, factors (or divisors), multiples, common factors, common multiple, HCF, LCM, prime factorisation, four operations, proper and improper fractions, mixed numbers, priority of operations, brackets, powers, roots, reciprocals, inverse</p>	<p><b>Vocabulary:</b> Acute, obtuse, reflex, right angle, triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon, decagon, polygon, regular, irregular, exterior angle, interior angle, vertically opposite, sum, point, alternate, corresponding, co-interior, allied, supplementary, equilateral, isosceles, scalene, right-angled, hypotenuse square, rectangle,</p>	<p><b>Vocabulary:</b> Recurring, terminating, decimal point, decimal place, fraction, numerator, denominator, mixed, top-heavy, improper, cancel, percentage, percentage change, original amount, multiplier, convert, multiplier, numerator, algebraic, variable, increase, decrease, interest, compound, depreciation, factorise, expand</p>	<p><b>Vocabulary:</b> 2-D ,triangle, equilateral, isosceles, scalene, square, kite, trapezium, isosceles trapezium, parallelogram, rhombus geometry, constructions, compass, protractor, units, cm, mm, m, round, accuracy, decimal places, significant figures, perimeter, area segments, scale drawings, translations, rotations, reflections</p>	<p><b>Vocabulary:</b> Probability, outcome, exhaustive, mutually exclusive, independent, dependent, conditional, experiment, theoretical, frequency, relative frequency, sample, bias, unbiased, distribution, expected, expectation, random, calculate, certain, impossible, likely, unlikely, even chance, zero, sum</p>	<p><b>Vocabulary:</b> Surd, rational, irrational, simplify, square, root, factor, multiple, factor, denominator, numerator, expand</p>

<p>operations, accuracy, decimal places, significant figures, approximation, estimate, errors, inequality notation <math>a &lt; x \leq b</math>, systematic, product rule, roots, indices, limits of accuracy, truncating, upper and lower bounds</p> <p>Formula, expression, expanding, brackets, binomials, linear, equation, identity, algebraic, substitute, rearrange, balance, positive, negative, variable, simplify, factor, manipulate, quadratic, factorise, cubic, coefficient, indices, sequences.</p>	<p>parallelogram, rhombus, trapezium, isosceles trapezium, kite, congruent, similar, SSS, SAS, ASA, RHS, bearing, clockwise, anticlockwise.</p> <p>Interpret, variable, representation, discrete, continuous, average, mean, median, mode, range, outlier, frequency, vertical, horizontal, frequency diagram, frequency table, tally, sector, angle, proportion, grouped, ungrouped, misleading, categorical, sample, population, univariate, empirical, box plot, interquartile, quartile, bar chart, pictogram, pie chart, stratified sample, biased, categorical, primary and secondary data.</p>	<p>Substitute, expression, term, value, formula, formulae, subject, inequality, greater than, less than, factor, common factor, factorise, expand, bracket, coefficient, power, like term, quadratic, squared, difference of two squares, identity, proof, input, output, function, inverse function, composite functions, variable, linear, binomials, cubic, equivalent</p>	<p>similar, enlargement, reflection, cone, pyramid, invariance, plan, elevation, surface area, volume.</p>	<p>Perimeter, 2-D shapes, square, rectangle, trapezium, isosceles trapezium, parallelogram, rhombus, kite, quadrilateral, compound shape, circle, semicircle, ruler, compass, constructions, perpendicular bisector, segment, point, bisecting, centre, radius, chord, diameter, circumference, tangent, arc, sector, segment, circle theorems, angles, radii, tangents, chords</p>	
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