



Mathematics @ KS5

Students doing AS and A2 Mathematics do two different courses: Pure Mathematics and Applied. The Pure syllabus builds on their algebraic understanding from iGCSE whilst the Applied syllabus applies students' mathematical understanding into physical situations (**Mechanics**) and statistical understanding (**Statistics**).

Exact curriculum timings might change due to school trips, calendar dates and other off-timetable days.

Application of 5Cs in Mathematics:

Mathematics provides a rich context for teaching and cultivating values such as **community, compassion, creativity, confidence, and challenge**. In a maths classroom, students can engage in collaborative problem-solving activities, fostering a sense of **community** as they work together, share ideas, and learn from one another. The exploration of mathematical concepts and real-world applications encourages students to develop **compassion** by understanding how maths can be used to address societal issues and make a positive impact. Mathematics also nurtures creativity by encouraging students to think critically, explore different problem-solving strategies, and discover innovative solutions. As students tackle **challenging** mathematical problems, they develop **confidence** in their abilities to analyse, reason, and persevere. The inherent nature of mathematics, with its logical structures and puzzles, presents a continuous **challenge** that pushes students to think deeply, expand their skills, and embrace new mathematical frontiers. Through the study of mathematics, students not only gain mathematical knowledge but also acquire valuable life skills and attitudes that contribute to their personal growth and success.

Current Program of study Y12 -13

Term 1				
Year 12			Year 13	
Topic and Content	Chapter 1: Quadratics Chapter 2: Functions	Chapter 1: Representation of Data Chapter 2: Measures of Central Tendency Chapter 3: Measures of Variation	Chapter 2: Logarithms Chapter 3: Trigonometry Chapter 11: Complex Numbers	Chapter 1: Velocity and Acceleration Chapter 2: Force and Motion in One Dimension Chapter 3: Forces in Two Dimensions
Skills	Ch1: completing the square, graphing quadratics, solving quadratic equations and inequalities, solving simultaneous equations Ch2: function notation, finding range/domain, finding inverses, transforming functions	Ch1: types of data, stem-and-leaf diagrams, histograms, cumulative frequency graphs, comparing different data representations Ch2: finding measures of the centre in a range of different contexts, including lists, tables and graphs: the mode and modal class, the mean and the median, combined means, coded mean Ch3: finding measures of spread in a range of different contexts: range, interquartile range and percentiles, variation and standard deviation, combined standard deviation, coded standard deviation	Ch2: recognise and use exponentials and ln, use the log/exponential laws, solve exponential equations, solve logarithmic equations Ch3: use and recognise the 6 ratios, use complex trigonometric identities, use the Rcos α form, prove trigonometric identities, solve complex trigonometric equations Ch11: understand what complex numbers are, complete complex arithmetic, find non-real roots of polynomials, change complex forms, represent complex numbers geometrically	Ch1: use suvat equations, use distance-time graphs to solve multi-stage problems, use velocity-time graphs to solve multi-stage problems Ch2: Newton's First Law, combination of forces, weight and motion due to gravity, normal contact force Ch3: resolving forces in equilibrium problems, non-equilibrium problems on slopes, finding resultant forces and direction of acceleration.

Methods of Assess	Induction Test P1 Assessment Homework (exam qs), Independent Practice	S1 Assessment Homework (exam qs), Independent Practice	Induction Test P3 Assessment Homework (exam qs), Independent Practice	
Term 2				
Year 12			Year 13	
Topic and Content	Chapter 3: Coordinate Geometry Chapter 7: Differentiation Chapter 8: Further Differentiation Chapter 4: Circular Measure Chapter 5: Trigonometry	Chapter 4: Probability Chapter 5: Permutations and Combinations	Chapter 4: Differentiation Chapter 5: Integration	Chapter 4: Friction Chapter 5: Connected Particles Chapter 6: Motion in a Straight Line. Chapter 7: Momentum
Skills	Ch3: equations of straight line, equations of a circle, finding intersection of lines and curves Ch7: find first and second derivatives, differentiate any polynomial, find gradients and tangents/normals of curves Ch8: understand and define increasing/decreasing functions, find stationary points, determining natures of points Ch4: understanding and using radians, finding arc length, finding sector area, solving problems	Ch4: experiments, events and outcomes, mutually exclusive events, independent events, conditional probability, dependent events and conditional probability Ch5: the factorial function, permutations, combinations, problem solving with permutations and combinations Review and Revision: for the mocks, including use of past paper questions and in-class mini-assessments.	Ch4: differentiate products and quotients, derive special functions, use the chain rule, differentiate and use parametric equations Ch5: use 'reverse differentiation' to integrate special functions, use trigonometric identities to integrate Review and Revision: for the mocks, including use of past paper questions and in-class mini-assessments.	Ch4: analyse friction as constant force, use the limits of friction, analyse change of direction and angles of friction Ch5: apply Newton's third law, analyse and solve problems with objects connected by strings and rods, solve problems involving objects in moving lifts. Ch6: apply calculus to motion and solve problems with the derivative with respect to time of displacement and velocity, solve problems with the integral with respect to time of velocity and acceleration. Ch7: solve problems involving collision with the principle of the conservation of momentum

	<p>Ch5: sketching trigonometric graphs, finding angles using inverse ratios, using basic identities, solving equations and problems</p> <p>Review and Revision: for the mocks, including use of past paper questions and in-class mini-assessments.</p>			
Methods of Assess	P1 Assessment (cumulative) Homework (exam qs), Independent Practice	S1 Assessment (cumulative) Homework (exam qs), Independent Practice	P3 Assessment (cumulative) Homework (exam qs), Independent Practice	
Term 3				
Year 12			Year 13	
Topic and Content	<p>Chapter 9: Integration</p> <p>Chapter 6: Series</p>	<p>Chapter 6: Probability Distributions</p> <p>Chapter 7: Binomial & Geometric Distributions</p> <p>Chapter 8: Normal Distribution</p>	<p>Chapter 8: Further Calculus</p> <p>Chapter 6: Numerical Methods</p> <p>Chapter 7: Further Algebra</p> <p>Chapter 10: Differential Equations</p> <p>Chapter 9: Vectors</p>	<p>Chapter 8: Work and Energy</p> <p>Chapter 9: Work-Energy Principle and Power</p>

Skills	<p>Ch9: integrate polynomials, calculate definite integrals, find areas under curves and areas enclosed between curves, find volumes of revolution</p> <p>Ch6: expand binomial brackets, recognise arithmetic and geometric sequences, use the formula for arithmetic terms and sums, use the formula for geometric terms and sums</p>	<p>Ch6: discrete random variables, understanding and completing probability distributions, expectation and variance of a random variable</p> <p>Ch7: understanding and using binomial distribution (uses, probabilities, expectation and variation), understanding and using the geometric distribution (uses, probabilities, expectation and variation)</p> <p>Ch8: continuous random variables, understanding the shape of a normal distribution, finding probabilities, solving problems with normal distributions, modelling with the normal distribution, approximating</p>	<p>Ch8: use derivatives of inverse tan, integrate rational functions, integrate by inspection, integrate using partial fractions, integrate by parts</p> <p>Ch6: find approximate roots of equations, derive and use iterative formulae</p> <p>Ch7: use partial fractions to express rational functions, know and use the binomial expansion formula (where n is not an integer)</p> <p>Ch10: derive differential equations, solve differential equations generally and explicitly</p> <p>Ch9: use vector notation, do vector arithmetic, calculate the magnitude and direction of vectors, find vector equations of lines, determine whether two line are parallel, intersect or skew, find and use the scalar product of vectors</p>	<p>Ch8: solve problems involving work done by a force, solve problems involving kinetic and potential energy</p> <p>Ch9: apply the work-energy principle, use the principle of conservation of energy in systems with both conservative and non-conservative forces, solve problems involving power</p>
Methods of Assess	Mocks P1 Assessment (cumulative) Homework (exam qs), Independent Practice	Mocks M1 Assessment (cumulative) Homework (exam qs), Independent Practice	Mocks P3 Assessment (cumulative) Homework (exam qs), Independent Practice	
Term 4: Exam Season				
Content	Revision	Revision	Revision	
Skills	<i>see above</i>	<i>see above</i>	<i>see above</i>	

	<i>Past paper packs and in-class mini-assessments.</i>	<i>Past paper packs and in-class mini-assessments.</i>	<i>Past paper packs and in-class mini-assessments.</i>	
Methods of Assessment	Homework (exam qs), Independent Practice	Homework (exam qs), Independent Practice	Homework (exam qs), Independent Practice	