Queen Elizabeth's Girls' School

Founded in 1888

Educating Women of the Future

Maths Key Stage 5 Curriculum

	Topic/Big Question	Focus
Year 12	**HT1: developing fluency and rigour in algebraic reasoning** How does algebra allow us to structure, manipulate, and prove mathematical ideas?	Students build core algebra skills and techniques, including quadratics, inequalities, simultaneous equations, and transformations of functions. They are introduced to binomial expansion, algebraic proof, and introduced to circular geometry, laying the foundations for reasoning and modelling at A Level.
	HT2: Building foundational mathematics to prepare for abstract reasoning How can we collect and analyse data to understand the world around us? How can trigonometry help us solve geometrical problems?	Students begin applied maths, exploring how data is collected, analysed, and used to model real-life situations. They also develop their understanding of trigonometry, focusing on graphs, non-right angled triangles, and practical applications. They will apply this knowledge as they consider objects traveling with a constant acceleration
	HT3: Modelling Change in the world around us How can we model and understand systems that change over time? What makes trigonometry such a powerful tool for modelling periodic behaviour?	Students begin calculus, learning how to differentiate and integrate functions to model change and solve real-world problems. They also explore trigonometric identities and vectors, deepening their ability to represent direction, movement, and periodic behaviour.
	HT4: Using Mathematics to make informed Decisions How do we model forces acting on moving or stationary objects? How can we use probability to test real-world claims with confidence? Why are exponential functions essential for modelling growth and decay?	Students study forces and motion through Newton's Laws, building key skills in mechanics and modelling. They explore exponential and logarithmic functions and apply hypothesis testing to real-world data, strengthening links between pure and applied maths.
	HT5: Modelling and analysing real-world systems How do we model objects when acceleration varies over time? What can data tell us about the relationships between variables? How can we analyse the turning effects of forces in real-world systems?	Students apply calculus to model variable acceleration and begin second year applied content studying moments and rigid bodies in mechanics. They analyse bivariate data through correlation and regression and explore conditional probability, linking ideas across all strands.
	HT6: Bridging to Year 13: Structure & Proof, Sequences and Radians How do we generalise mathematical ideas and structures? What does it mean to prove something is always true? Why do mathematicians use radians,	During the final half term of year 1, learners will begin to engage with topics from the year 2 A level curriculum. They will analyse functions and further expand their knowledge of proofs. The foundation for many concepts taught in year 13 will be constructed by further diving into partial fractions, sequences & series, extending the Binomial expansion and working with radians. .

	Topic/Big Question	Focus
Year 13	**HT1: Mathematical relationships that describe structure motion, and cycles** How do functions describe and structure mathematical relationships? How can trigonometric functions model real-world, periodic behaviour?	Students begin the year by extending their knowledge of functions, including domain, range, inverse and composite functions. They explore trigonometric functions such as sec, cosec, and cot, along with compound and double angle identities used to model periodic behaviour. In mechanics, they study forces and friction in both static and dynamic systems, particularly on inclined planes, developing confidence in applying Newton's Laws.
	HT2: Advancing our Mathematic toolkit How can we describe motion and curves using parameters instead of x and y? How do we extend calculus to solve increasingly complex problems? How do forces shape motion in two dimensions and in rigid body systems?	In this half term students are introduced to parametric equations, gaining new ways to describe curves and motion beyond x and y coordinates. They expand their differentiation techniques using the product, quotient, and chain rules, along with implicit and parametric forms. In mechanics, they apply SUVAT and calculus to model projectile motion, and begin studying applications of forces, including rigid bodies in equilibrium.
	HT3: Adapting our Mathematical perspective How can calculus be extended to solve real-world problems involving change? How can we estimate the area under a curve when integration is not possible? How are things distributed naturally in the real world?	Students consolidate advanced integration techniques, including substitution, by parts, and partial fractions, and apply them to model real-world problems. They use the trapezium rule for numerical approximation and solve differential equations to model rates of change in systems like cooling and population growth. In statistics, they complete the course by studying PMCC and the normal distribution, enabling them to analyse relationships and standardise data for decision making.
	HT4: Applying Mathematics in unfamiliar contexts How can we use numerical methods to approximate solutions to complex equations? How do vectors help us solve geometric problems in three dimensions?	Students are introduced to numerical methods for solving equations when algebraic methods are not suitable. They learn iterative techniques, including fixed-point iteration and the Newton-Raphson method, and explore their graphical and algebraic interpretation. In pure maths, they extend their understanding of vectors into three dimensions. They use vector equations to represent lines in space and apply scalar products to solve geometric problems involving angles, intersections, and distances.
	HT5: Consolidating Mathematical ideas Is it possible to connect mathematical ideas together?	This half term concludes the A Level course with a focus on consolidation and preparation for final exams. Students review and connect key concepts across pure mechanics, and statistics, applying them to solve complex, multi-step problems. In mechanics, they complete their study of vectors and apply kinematics in a range of modelling scenarios, strengthening their understanding of motion in context.