

MATHEMATICS

YEAR 10

Advanced Geometry and Trigonometry

Students will engage in a rigorous exploration of complex shapes and advanced problem-solving techniques. This unit focuses on solving surface area and volume problems for composite solids, enhancing spatial awareness and mathematical precision. Students will develop deductive reasoning skills through proofs and numerical exercises involving plane shapes. The curriculum includes an in-depth study of geometric principles, using triangle and angle properties to prove congruence and similarity. Additionally, students will apply trigonometry to calculate unknown angles in right-angled triangles, acquiring practical skills for real-world applications.

Financial Literacy and Algebraic Proficiency

This unit offers a comprehensive study of key mathematical concepts essential for financial literacy and algebraic proficiency. Students will explore the relationship between simple and compound interest, equipping them with practical knowledge for real-life financial decisions. The curriculum includes the expansion of binomial expressions and the factorisation of monic quadratic expressions, enhancing algebraic manipulation skills. Mastery of substitution to find unknown values in various formulas, along with performing the four operations with simple algebraic fractions, is emphasised.

Algebra and Geometry: Equations, Graphs, and Lines

In this comprehensive unit, students will tackle a variety of algebraic challenges, starting with solving linear equations and inequalities. They will explore the deep connections between algebraic and graphical representations of relations, enhancing their understanding of how equations translate into visual graphs. The unit also covers the relationships between parallel and perpendicular lines, providing essential geometric insights. Additionally, students will solve simple quadratic equations and pairs of simultaneous equations, developing critical problem-solving skills that form the cornerstone of advanced mathematical studies.

Data Analysis and Probability: Mastering Statistical Relationships and Predictions

In this dynamic unit, students delve into the world of data analysis and probability with a focus on practical and analytical skills. They will compare data sets by interpreting various data displays, gaining insights into the shape and distribution of information. Students will describe and analyze bivariate data, especially where time is the independent variable, and uncover statistical relationships between two continuous variables. Evaluating statistical reports and listing outcomes for multi-step chance experiments, students will assign probabilities and calculate quartiles and inter-quartile ranges. This unit equips students with essential skills for understanding and interpreting data, fostering a deeper grasp of statistical concepts and their real-world applications.

MATHEMATICS

YEAR 10

Mathematics Extension

Year 10 Extension Mathematics serves as a preparatory course for General Mathematics, Mathematical Methods, and Mathematics Specialist. The course is designed to emulate the pace and rigor of senior mathematics, incorporating advanced topics that provide foundational skills essential for success in Years 11 and 12. This unit aims to equip students with the necessary knowledge and experience to excel in their subsequent mathematical studies. In addition to the Year 10 Core Mathematics curriculum, students will engage with the following topics:

Mastering Shapes, Functions, and Equations

In this unit, students will systematically address a range of geometric and trigonometric concepts, preparing them for future mathematical studies. They will solve complex problems related to the surface area and volume of right pyramids, cones, spheres, and composite solids, enhancing their spatial reasoning abilities. The curriculum includes the establishment of sine, cosine, and area rules for any triangle, enabling students to effectively tackle related problems. Students will also utilize the unit circle to define and graph trigonometric functions, employing both manual methods and digital technologies. Additionally, they will solve basic trigonometric equations and apply Pythagoras' Theorem along with trigonometric principles to resolve three-dimensional problems in right-angled triangles.

Mastering Equations and Curves

In this unit, students will systematically explore both linear and non-linear relationships, thereby enhancing their algebraic and graphical proficiencies. They will engage with simple exponential equations and develop the ability to describe, interpret, and sketch parabolas, hyperbolas, circles, and exponential functions, including their transformations. Furthermore, students will apply their understanding of polynomials to sketch various curves and elucidate their features based on the given equations. The curriculum also encompasses the factorisation of monic and non-monic quadratic expressions, enabling students to solve a broad spectrum of quadratic equations derived from diverse contexts.

Mastery of Rational Numbers, Logarithms, and Polynomials

In this unit, students will enhance their understanding of number theory and algebraic techniques. They will rigorously define rational and irrational numbers, perform operations with surds and fractional indices, and thoroughly explore the properties of these unique number types. The curriculum includes a detailed introduction to logarithms, enabling students to establish and apply the laws of logarithms in various contexts. Furthermore, students will investigate the concept of polynomials, utilizing the factor and remainder theorems to solve complex problems.

Mastering Statistical and Geometric Concepts

In this unit, students will engage in the critical analysis of studies reported in digital media and other sources, focusing on their planning and implementation. The unit emphasizes data representation and interpretation, guiding students to calculate and interpret the mean and standard deviation of data sets to facilitate meaningful comparisons. Students will leverage information technologies to investigate bivariate numerical data sets, employing straight-line models where appropriate to describe relationships amidst variation. Additionally, the curriculum includes proving and applying angle and chord properties of circles, providing a thorough understanding of these geometric principles. This unit aims to develop analytical and technological skills essential for advanced mathematical studies and practical applications.