Advanced Mathematics

2 units for each of Year 11 and Year 12 HSC
Board Developed Course
Prerequisites: The Mathematics Advanced Year 11 course has been developed on the assumption that students have studied the content and achieved the outcomes of the NSW *Mathematics Years 7–10 Syllabus.* In particular, the content and outcomes of all substrands of Stage 5.1 and Stage 5.2, the following substrands of Stage 5.3: Algebraic techniques, Surds and indices, Equations, Linear relationships, Trigonometry and Pythagoras' theorem, Single variable data analysis and at least some of the content from the following substrands of Stage 5.3: Non-linear relationships and Properties of Geometrical Shapes.
Exclusions: Students may **not** study the Mathematics Advanced course in conjunction with the Mathematics Standard 1 or the Mathematics Standard 2 course

Course Description:

- The Mathematics Advanced course is a calculus-based course focused on developing student awareness of mathematics as a unique and powerful way of viewing the world to investigate order, relation, pattern, uncertainty and generality.
- The Mathematics Extension 1 Year 11 course includes the Mathematics Advanced Year 11 course. The Mathematics Extension 1 Year 12 course includes the Mathematics Advanced Year 12 course.
- All students studying the Mathematics Advanced course will sit for an HSC examination.

The study of Mathematics Advanced in Stage 6:

- enables students to develop their knowledge, understanding and skills in working mathematically and in communicating concisely and precisely
- provides opportunities for students to consider various applications of mathematics in a broad range of contemporary contexts through the use of mathematical modelling and use these models to solve problems related to their present and future needs
- provides opportunities for students to develop ways of thinking in which problems are explored through observation, reflection and reasoning
- provides a basis for further studies in disciplines in which mathematics and the skills that constitute thinking mathematically have an important role
- provides an appropriate mathematical background for students whose future pathways may involve mathematics and its applications in a range of disciplines at the tertiary level

Content:
The Mathematics Advanced Year 11 course content is comprised of five Topics, with the Topics divided into Subtopics. The Topics and Subtopics are:

Year 11
Topic: Functions — Working with Functions
Topic: Trigonometric Functions — Trigonometry and Measure of Angles
Trigonometric Functions and Identities
Topic: Calculus — Introduction to Differentiation
Topic: Exponential and Logarithmic Functions — Logarithms and Exponentials
Topic: Statistical Analysis — Probability and Discrete Probability Distributions

Year 12
Topic: Functions — Graphing Techniques
Topic: Trigonometric Functions — Trigonometric Functions and Graphs
Topic: Calculus — Differential Calculus
The Second Derivative
Integral Calculus
Topic: Financial Mathematics — Modelling Financial Situations
Topic: Statistical Analysis — Descriptive Statistics and Bivariate Data Analysis
Random Variables