



# (Advanced and Extension 1)

The Mathematics Stage 6 syllabuses are designed to offer opportunities for students to think mathematically through questioning, communicating, reasoning and reflecting. They promote development of 21st-century knowledge, skills, understanding, values and attitudes and provide challenge. Students generalise, find connections, think critically and creatively, using appropriate technology to support mathematical activity.

# **Careers in Mathematics**

Occupations where a study of Mathematics would be useful are endless, but could include: -

Accountant Actuary Aerospace engineer Agricultural engineer Agricultural scientist Air traffic controller Architect Astronomer Auditor Bank officer Biochemist Biotechnologist Cartographer **Chemical engineer** Chemist **Civil engineer** Company secretary Computer engineer Economist Financial planner Geophysicist Hospital administrator Industrial designer Industrial engineer Investment analyst Logistics clerk Market researcher Materials engineer

Mathematician Mechanical engineer Mechatronic engineer Medical scientist Metallurgist Meteorologist Mining engineer Naval architect Optometrist Orthoptist Patent examiner Pharmacist Pharmacologist Physicist Pilot Programmer Quantity surveyor Radiation therapist Retail buyer Software engineer Sports administrator Statistician Surveyor Valuer



www.melville-h.schools.nsw.edu.au

#### **MELVILLE HIGH SCHOOL**

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# Why study Mathematics

### (Advanced and Extension 1)?

Mathematics is the study of order, relation, pattern, uncertainty and generality and is underpinned by observation, logical reasoning and deduction.

The Mathematics Advanced course is focused on enabling students to appreciate that mathematics is a unique and powerful way of viewing the world to investigate order, relation, pattern, uncertainty and generality. The course provides students with the opportunity to develop ways of thinking in which problems are explored through observation, reflection and reasoning.

The Mathematics Advanced course provides a basis for further studies in disciplines in which mathematics and the skills that constitute thinking mathematically have an important role. It is designed for those students whose future pathways may involve mathematics and its applications in a range of disciplines at the tertiary level.

Extension Mathematics is studied in addition to Mathematics Advanced and classes are run offline. This means classes can be before or after school or on the senior study day.

# Year 11 Course Topics

- Working with Functions
- Trigonometry and Measure of Angles
- Trigonometric Functions and Identities
- Introduction to Differentiation
- Logarithms and Exponentials
- Probability and Discrete
  Probability Distributions



# Year 12 Course Topics

- Graphing Techniques
- Trigonometric Functions and Graphs
- Differential Calculus
- The Second Derivative
- Integral Calculus
- Modelling Financial Situations
- Descriptive Statistics and Bivariate Data Analysis
- Random Variables

# **Mathematics Extension 1**

- enables students to develop thorough knowledge, understanding and skills in working mathematically and in communicating concisely and precisely
- provides opportunities for students to develop rigorous mathematical arguments and proofs, and to use mathematical models extensively
- provides opportunities for students to develop their awareness of the interconnected nature of mathematics, its beauty and its functionality
- provides a basis for progression to further study in mathematics or related disciplines and in which mathematics has a vital role at a tertiary level
- provides an appropriate mathematical background for students whose future pathways may involve mathematics and its applications in such areas as science, engineering, finance and economics.



# Year 11 Course Topics

- Further Work with Functions
- Polynomials

**Extensio** 

- Inverse Trigonometric Functions
- Further Trigonometric Identities
- Rates of Change
- Working with Combinatorics



## Year 12 Course Topics

- Proof by Mathematical Induction
- Introduction to Vectors
- Trigonometric Equations
- Further Calculus Skills
- Applications of Calculus
- The Binomial Distribution

Further information about the course content and outcomes can be obtained from the website below. Mathematics Advanced http://syllabus.nesa.nsw.edu.au/mathematicsadvanced-stage6/ Mathematics Extension 1 http://syllabus.nesa.nsw.edu.au/mathematicsextension-1-stage6/