# Mathematical Methods

## General senior subject

General

## Recommendation

A High Achievement (B) in Year 10 Mathematics or a Sound Achievement (C) in Year 10 Extension Mathematics.

## Rationale

The major domains of mathematics in Mathematical Methods are Algebra, Functions, relations and their graphs, Calculus and Statistics. Topics are developed systematically, with increasing levels of sophistication, complexity and connection, and build on algebra, functions and their graphs, and probability from the P–10 Australian Curriculum. Calculus is essential for developing an understanding of the physical world. The domain Statistics is used to describe and analyse phenomena involving uncertainty and variation. Both are the basis for developing effective models of the world and solving complex and abstract mathematical problems. The ability to translate written, numerical, algebraic, symbolic and graphical information from one representation to another is a vital part of learning in Mathematical Methods.

Students who undertake Mathematical Methods will see the connections between mathematics and other areas of the curriculum and apply their mathematical skills to real-world problems, becoming critical thinkers, innovators and problem-solvers. Through solving problems and developing models, they will appreciate that mathematics and statistics are dynamic tools that are critically important in the 21st century.

## Pathways

A course of study in Mathematical Methods can establish a basis for further education and employment in the fields of natural and physical sciences (especially physics and chemistry), mathematics and science education, medical and health sciences (including human biology, biomedical science, nanoscience and forensics), engineering (including chemical, civil, electrical and mechanical engineering, avionics, communications and mining), computer science (including electronics and software design), psychology and business.

## Objectives

- By the conclusion of the course of study, students will:
- recall mathematical knowledge
- use mathematical knowledge
- communicate mathematical knowledge
- evaluate the reasonableness of solutions
- justify procedures and decisions
- solve mathematical problems.

## Delivery (mode, time requirements, lessons)

Students are expected to undertake independent study to complete tasks and assessment in accordance with the Work Rate Calendar. Students also have access to live sessions each week. Course materials can be accessed in the learning management system.

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## Student requirements

- Computer, access to email, scanner and internet, telephone and USB headset with microphone, exercise book and a protractor.
- Graphics Calculator (preferably Casio FXCG70AU or later)

## Structure

| Unit 1 | Unit 2 | Unit 3 | Unit 4 |
|---|---|---|---|
| **Surds, algebra, functions and probability**<br>Surds and quadratic functions<br>Binomial expansion and cubic functions<br>Functions and relations<br>Trigonometric functions<br>• Probability | **Calculus and further functions**<br>Exponential functions<br>Logarithms and logarithmic functions<br>Introduction to differential calculus<br>Applications of differential calculus<br>• Further differentiation | **Further calculus and introduction to statistics**<br>Differentiation of exponential and logarithmic functions<br>Differentiation of trigonometric functions and differentiation rules<br>Further applications of differentiation<br>Introduction to integration<br>• Discrete random variables | **Further calculus, trigonometry and statistics**<br>Further integration<br>Trigonometry<br>Continuous random variables and the normal distribution<br>Sampling and proportions<br>• Interval estimates for proportions |

## Assessment

### Formative assessment

| Unit 1 | | Unit 2 | |
|---|---|---|---|
| Examination | | Problem-solving and Modelling Task | |
| | | Examination | |
| An average of C or higher for QCE credit | 1 credit | An average of C or higher for both pieces of assessment for QCE credit | 1 credit |

### Summative assessment

| Unit 3 | | Unit 4 | |
|---|---|---|---|
| Summative internal assessment 1 (IA1): 20%<br>Problem-solving and modelling task | | | |
| Summative internal assessment 2 (IA2):<br>• Examination — short response | 15% | Summative internal assessment 3 (IA3):<br>Examination — short response | 15% |
| Summative external assessment (EA): 50%<br>• Examination — combination response | | | |

In Units 3 and 4 students complete four summative assessments. The results from each of the assessments are added together to provide a subject score out of 100. Students will also receive an overall subject result (A–E).

**Disclaimer** All of the above information is accurate at the time of publication