

Assumed knowledge:

This is 'stuff' you have covered in years 8 and above.

- Familiarity with sequence and series notation and related simple applications
- the use of sine and cosine rules in non-right-angled triangles and the following mathematics is assumed:
- the solution of triangles in two-dimensional situations;
- the sum of the interior angles of a triangle is 180° ;
- the sum of the exterior angles of a convex polygon is 360° ;
- corresponding angles of lines cut by a transversal are equal if, and only if, the lines are parallel;
- alternate angles of lines cut by a transversal are equal if, and only if, the lines are parallel;
- opposite angles of a parallelogram are equal;
- opposite sides of a parallelogram are equal in length;
- the base angles of an isosceles triangle are equal;
- the line joining the vertex to the midpoint of the base of an isosceles triangle is perpendicular to the base;
- the perpendicular bisector of the base of an isosceles triangle passes through the opposite vertex;
- the angle subtended by an arc at the centre of a circle is twice the angle subtended by the same arc at the circumference;
- the angle in a semicircle is a right angle;
- angles in the same segment of a circle are equal;
- the sum of the opposite angles of a cyclic quadrilateral is 180° ;
- an exterior angle of a cyclic quadrilateral and the interior opposite angle are equal;
- the two tangents to a circle from an exterior point are equal in length;
- a tangent to a circle is perpendicular to the radius to the point of contact;
- the angle between a tangent to a circle and a chord through the point of contact is equal to the angle in the alternate segment.
- Probability and statistics covered in Unit 1 and 2 specialist math.

Areas of Study:

1. Functions and graphs

In this area of study students cover inverse circular functions, reciprocal functions, rational functions and other simple quotient functions, the absolute value function, graphical representation of these functions, and the analysis of key features of their graphs including intercepts, asymptotic behaviour and the nature and location of stationary points, points of inflection, periodicity, and symmetry.

2. Algebra

In this area of study students cover the expression of simple rational functions as a sum of partial fractions; the arithmetic and algebra of complex numbers, including polar form; points and curves in the complex plane; introduction to factorisation of polynomial functions over the complex field; and an informal treatment of the fundamental theorem of algebra.

3. Calculus

In this area of study students cover advanced calculus techniques for analytic and numeric differentiation and integration of a range of functions, and combinations of functions; and their application in a variety of theoretical and practical situations, including curve sketching, evaluation of arc length, area and volume, differential equations and kinematics.

4. Vectors

In this area of study students cover the arithmetic and algebra of vectors, linear dependence and independence of a set of vectors, proof of geometric results using vectors, vector representation of curves in the plane and vector kinematics in one, two and three dimensions.

5. Mechanics

In this area of study students cover an introduction to Newtonian mechanics, for both constant and variable acceleration.

6. Probability and Statistics

In this area of study students cover statistical inference related to the definition and distribution of sample means, simulations and confidence interval.

OUTCOMES (these are for your 'S')

For each unit you are required to demonstrate achievement of three outcomes which encompass all Areas of Study.

Outcome 1 (You can do the 'skills' and processes)

On the completion of each unit the student should be able to define and explain key concepts as specified in the content from the areas of study, and apply a range of related mathematical routines and procedures.

Outcome 2 (You can APPLY the skills and processes)

On the completion of each unit the student should be able to apply mathematical processes, with an emphasis on general cases, in non-routine contexts, and analyse and discuss these applications of mathematics

Outcome 3 (You can apply CAS where appropriate)

On completion of each unit the student should be able to select and appropriately use numerical, graphical, symbolic and statistical functionalities of technology to develop mathematical ideas, produce results and carry out analysis in situations requiring problem-solving, modelling or investigative techniques or approaches.

Assessment:

School Assessed Course Work:

This is used to create a RANKING order. If you achieve 100% on say the Unit 3 investigation this DOES NOT MEAN you get the full 17% allocated to you in your study score!

Unit 3:

A mathematical investigation of a practical or theoretical context involving content from two or more areas of study, with the following three components of increasing complexity:

Contribution to study score: 17%

Unit 4:

TWO tasks (modelling or problem solving) One of which is to be related to the "Mechanics" or "Probability and Statistics" area of study.

Contribution to study score: 17%

Examinations:

- **Exam 1: November. One hour.** Technology free (ie NO calculator). No Notes. Consists of a collection of short-answer and some extended-answer questions covering all areas of study in relation to Outcome 1. Contribution to study score: 22%
- **Exam 2: November. Two hour.** Bound Notes allowed. Use of CAS calculator assumed. Consists of a collection of multiple-choice questions and extended-answer questions covering all areas of the study in relation to all three outcomes, with an emphasis on Outcome 2

Contribution to study score: 44%

Notes:

- Notes are supplied to you (either hard copy OR electronically). You may also keep as separate exercise book if you wish.
- Keep it up to date!
- This may be useful as your bound notes at the end of year.
- You may wish to keep an internal margin to be able to create a tab-index

Skills and Exercises:

- Keep a separate exercise book – or loose leaf.
- Minimum questions from each exercise will be set to get key concepts and skills. If you need to do more.... DO more!!!
- Expect an average of one exercise per lesson.
- Where appropriate, be able to do question with and without CAS

URGENT HELP: -- well within reason... EMAIL: evangelou.chris.c@edumail.vic.gov.au