



# Wollongong College Australia

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# Foundation Studies Program

(CRICOS course codes: 007732G, 023266F)

## Subject Outline Summer 2009/10

## FSP 116 Mathematics 1

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WCA-FSP 116-S0/6

# Mathematics

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## Subject description

Mathematics 1 provides a review of basic arithmetic and algebraic concepts before developing fundamental techniques in algebra and presenting techniques of descriptive statistics. Applications of algebraic techniques focus on solving linear, quadratic and simultaneous equations and appropriate use of formulae. The subject covers co-ordinate geometry relevant to linear equations. Topics in the statistics component of the subject include presentation of data in tables and graphs, summary measures of data, probability and interpretation of normally distributed data sets.

## Subject structure

Mathematics is an 8 credit point, two-session subject delivered as 4 hours of scheduled classes per week. Both Session 1 and Session 2 are valued at 4 credit points. The subject consists of a 1 x 2 hour lecture and 1 x 2 hour tutorial each week. Each session is of 14 week's duration with face-to-face classes scheduled for the first 12 weeks and a study/examination period in Weeks 13 and 14.

In addition to scheduled class sessions, students are expected to spend additional time in individual study and research. As a general guideline students will need to spend at least 1 hour in private study (including completing homework and revision) for every hour of scheduled class time. Students with a weak mathematics background may need to spend considerably more time in private study in order to obtain a satisfactory grade in the subject.

Teachers will be available for a consultation time each week. Students will be notified of the time and location of the consultation session during Week 1 of the Session. It is recommended that students experiencing difficulty with this subject arrange to consult with the teacher as difficulties are encountered.

Some students may require tutorial support to improve language/literacy skills. Where this is recommended, students will be advised to use the College's self-access facilities in the Multimedia Centre in their own time. These facilities are located upstairs in building 30. Where this is recommended, your attendance at and use of these facilities may form part of your participation mark.

## Learning resources

Students will be required to purchase the following text for this subject:

*3 Unit Mathematics Book 1* by S.B. Jones and K.E. Couchman ISBN: 0-582-81053-1

## Calculators

Students will be required to bring a scientific calculator to all classes. Students who need to purchase a calculator for this subject are strongly recommended to purchase a Casio FX-82 series (approximately \$25 – \$40) calculator.

Only approved scientific calculators will be permitted in exams. The list of approved calculators is located on the college website ([www.wca.uow.edu.au](http://www.wca.uow.edu.au)). Students should refer to this list to confirm their calculator has been approved for use in exams.

Programmable calculators are not permitted. Programmable calculators usually have a RUN, EXE, CALC or SOLVE button.

## Subject outcomes

Successful completion of Mathematics 1 will enable students to:

- ▶ demonstrate a working knowledge of the basic skills of algebra and co-ordinate geometry.
- ▶ solve linear and quadratic equations.
- ▶ solve simultaneous equations.
- ▶ construct and analyse equations of linear functions.
- ▶ organise raw data into tables and graphs.
- ▶ demonstrate a working knowledge of statistical measures and the normal distribution.
- ▶ solve problems using probability rules.

## Subject outline in weeks

The following guide to lessons and activities may be adjusted to suit the needs of the group as long as subject outcomes and assessment criteria are met.

### Week 1

Convert measurements into various units.

Use appropriate symbols for measurement.

Round measurements to specified number of significant figures/decimal places.

Express numbers in scientific notation.

Indices.

Percentages & Decimals.

### Week 2

Simplify algebraic terms by addition, subtraction, multiplication and division.

Expand algebraic expressions.

Factorise algebraic expressions.

### Week 3

Simplify algebraic fractions using factorisation including difference of two squares.

Solve linear equations.

Substitution.

Changing the subject of formulae.

### Week 4

Surds including simplifying, addition and subtraction.

Solve quadratic equations using factorisation and quadratic formula.

Draw graphs of linear functions.

Determine the gradient of a straight line either from its equation or from a graph.

### Week 5

Determine equations of parallel and perpendicular lines.

Solve simultaneous equations and hence determine the intersection of two lines or a line and a curve.

Find the distance between two points on a line.

Find the midpoint of an interval.

## **Week 6**

Revision for mid-session test.

Use function notation. Interpret range and domain of functions.

Draw graphs of hyperbolic and circular functions.

Determine the equation of a circle from its radius and centre .

## **Week 7**

### **Mid-session test**

Sketch quadratic functions with 2 roots, 1 root and no real roots.

Solve quadratic inequalities.

## **Week 8**

Calculate and interpret the discriminant.

Determine the maximum and minimum value of quadratic functions.

Interpret absolute values.

Solve equations involving absolute values.

## **Week 9**

Solve inequalities.

Solve inequalities with absolute values.

Summarisation of data into tables and graphs.

Use measures of centre to summarise a data set.

## **Week 10**

Describe variation in data using range, interquartile range, 5-number summary.

Variance and standard deviation.

## **Week 11**

Bivariate Data Analysis – analysing the relationship between two variables, including correlation and simple linear regression..

## **Week 12**

Revision for final exam.

## **Weeks 13 & 14 Final examination Period**

Examination and study period. Please refer to examination timetable for the exact date, time and location of the final exam.

## Tutorial/Homework Schedule

### FSP 116 Mathematics 1

The Exercises listed are contained in the textbook *3 Unit Mathematics Book 1*.

<b>Week 1</b>	<p><b>Section 1: Review of Algebra</b></p> <p><b>1.1 Basic Arithmetic</b> Measurements &amp; Units Significant Figures</p> <p>Indices</p> <p>Scientific Notation Percentages, Decimals</p>	<p>Supplementary Notes Supplementary Notes</p> <p>Ex 1.6 ,Ex1.7, Ex1.8, Ex1.9, Ex1.10</p> <p>Ex 1.11, Ex1.12, Ex 1.13 Supplementary Notes</p>
<b>Week 2</b>	<p><b>1.2 Basic Algebra</b> Collecting like terms Removing Brackets</p> <p>Multiplication of Algebraic Expression</p> <p>Binomial Products Difference of two Squares Square of a Binomial Further Products</p> <p><b>1.3 Factorisation</b> Common Factors Grouping in Pairs Difference of two Squares Quadratic Trinomials Combining Methods</p>	<p>Ex 2.1 Ex 2.2, Ex 2.4</p> <p>Ex 2.5, Ex 2.6, Ex 2.7</p> <p>Ex 2.8 Ex 2.9 Ex 2.10 Ex 2.11</p> <p>Ex 3.1 Ex 3.2 Ex 3.3 Ex 3.4, Ex 3.5 Ex 3.6</p>
<b>Week 3</b>	<p><b>1.3 Factorisation cont.</b> Simplification</p> <p>Multiplication and Division Addition and Subtraction</p> <p><b>1.4 Surds</b> Simplifying Addition and Subtraction</p> <p><b>1.5 Equations</b> Equations Substitution</p>	<p>Ex 3.9</p> <p>Ex 3.10 Ex 3.11</p> <p>Ex 2.15 Ex 2.16</p> <p>Ex 4.1 Ex 2.12</p>
<b>Week 4</b>	<p><b>1.5 Equations cont.</b> Changing the Subject</p> <p>Quadratic Equations</p> <p><b>1.6 Linear Functions</b> Introduction Gradient</p>	<p>Ex 4.2, Supplementary Notes</p> <p>Ex 4.5, Ex 4.7</p> <p>Ex 10.1, Supplementary Notes Ex 10.2</p>

<b>Week 5</b>	<b>1.6 Linear Functions cont.</b> Equation of Straight Lines  Parallel and Perpendicular Intersection of two Lines Distance between two Points and Midpoint of an Interval	Ex 10.1, Ex 10.2, Ex 10.3  Ex 10.4 Ex 10.5 Ex 10.7
<b>Week 6</b>	<b>1.7 Functions</b> Function notation. Domain and range.  Graphs of hyperbolic functions  Graphs of absolute values Circles	Ex 7.1 Ex 7.2  Ex 7.4  Ex 7.5 Ex 7.7, Ex 17.3
<b>Week 7</b>	<b>1.8 Quadratic Polynomial</b> Graphs of quadratic functions Solution of quadratic inequalities	Ex 15.1, Supplementary Notes Ex 15.2
<b>Week 8</b>	<b>1.8 Quadratic Polynomial cont.</b> Quadratic equations and the discriminant Maximum or minimum value of quadratic functions <b>1.9 Further Equations</b> Absolute values Solving equations with absolute values	Ex 15.3 Ex 15.4 Ex 15.7  Ex 4.3 Ex 4.4
<b>Week 9</b>	<b>1.9 Further Equations cont.</b> Solving inequalities Solving inequalities with absolute values  <i>Section 2: Introduction to Statistics</i> <b>2.1 Organising Data</b> Summarisation of data into tables and graphs. <b>2.2 Analysing Data</b> Use measures of centre	Ex 4.11 Ex 4.12, Ex 4.13  Supplementary Notes  Supplementary Notes
<b>Week 10</b>	Describe variation	Supplementary Notes
<b>Week 11</b>	<b>2.3 Bivariate Data Analysis</b> Correlation Linear regression	Supplementary Notes Supplementary Notes
<b>Week 12</b>	Revision	To be supplied

# Assessment

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## Assessment and plagiarism policy

All written assessment tasks, with the exception of examinations and in-class tasks, must be word-processed unless students are otherwise advised.

Students must keep copies of all assessment tasks submitted for marking with the exception of class tests and examinations.

Plagiarism is a form of cheating or stealing that happens when a student uses someone else's work and presents it as his/her own without showing where it comes from. To avoid this, students are expected to submit their own original work for assessment and to accurately acknowledge all references and sources used in essays and assignments.

For information regarding assessment, plagiarism, acknowledging sources and examination rules, please refer to the Wollongong College Australia Student Handbook <http://www.wca.uow.edu.au/handbook>

## Assessment schedule

Task	Due	Weighting	Length/Time
Quizzes	Weeks 4, 9 & 12	15%	10-15 mins
Mid-session test	Week 7	30%	1 hour
Final Examination	Week 13/14	50%	2 hours
Participation	Ongoing	5%	Weeks 1-12

## Marking Guidelines

WCA best practice is that students can normally expect to have assessment tasks handed back within two weeks, and before the next assessment task is due. On occasion there may be exceptions to this time frame due to, for example, the size of the task, the size of the class, teacher illness or teacher leave.

Where there are several teachers marking a major assessment task, tasks will be handed back by all the teachers within the same week.

# Assessment criteria and explanation of components

All assessment components are marked according to set marking criteria.

## Quizzes

15%

Three quizzes will be given during tutorial times in weeks 4, 9 & 12. These quizzes will be informal assessment tasks of approximately 10 - 15 minutes duration, and will cover only one or two topics. Students will be given at least one week's notice of each quiz.

## Mid-Session Test

30%

The mid-session test will be held in week 7. This test will cover the material covered in weeks 1 – 5 of this session.

## Final Examination

50%

The final examination will be held during the formal examination period in weeks 13 and 14, and will examine all topics covered during this session.

## Participation

5%

Active participation in tutorials is expected of all students in all classes. Participation in class discussions will help develop the student's confidence in questioning and commenting on material presented, encourage critical thinking and allow the tutor to evaluate the student's progress.

Participation marks may be allocated according to the following criteria:

- ▶ Active participation in tutorial support classes where recommended
- ▶ Recording answers to tutorial exercises in designated tutorial exercise book.
- ▶ Bringing tutorial exercise book to all classes.
  
- ▶ Active participation in class discussions and group work
- ▶ Proactive consultation with class teacher and/or tutorial support where relevant
- ▶ Completion of non-assessable tasks including homework and practice tasks
- ▶ Preparation for teacher-student consultation sessions