**Sample Course Outline**

Mathematics Applications

ATAR Year 11

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# Sample course outline

# Mathematics Applications – ATAR Year 11

## Unit 1

In Unit 1 students will be provided with opportunities to:

* understand the concepts and techniques in consumer arithmetic, algebra and matrices, and shape and measurement
* apply reasoning skills and solve practical problems in consumer arithmetic, algebra and matrices, and shape and measurement
* communicate their arguments and strategies when solving problems, using appropriate mathematical language
* interpret mathematical information, and ascertain the reasonableness of their solutions to problems
* choose and use technology appropriately and efficiently.

This course outline assumes an allocation of 4 hours contact time per week for the course.

#### Each semester is based on a 15 week block.

| **Time placement (and allocation)** | **Topic/s** | **Key teaching points** |
| --- | --- | --- |
| **Semester 1 (Unit 1)** |
| Weeks 1–5(20 hours) | Topic 1.1Consumer arithmetic | **Applications of rates and percentages and use of spread sheets** (1.1.1 – 1.1.8)* Salary, wages (including piecework/overtime) allowances and commissions
* Government allowances and pensions
* Prepare personal budgets
* Unit cost method for price comparison
* Percentage increase and decrease, simple and compound interest
* Currency exchange rates
* Share dividends and price earnings ratio
* Use a spreadsheet for above computations as appropriate
 |
| Weeks 6–7(5 hours) | Topic 1.2Algebra and Matrices | **Linear and non-linear expressions** (1.2.1 – 1.2.3)* Numerical substitution into expressions
* Formulae evaluation
* Spread sheets, tables and formulas
 |
| Weeks 7–9(10 hours) | Topic 1.2Algebra and Matrices | **Matrices and matrix arithmetic** (1.2.4 – 1.2.7)* Matrices and storage/displaying of information
* Size and type of matrices
* Matrix arithmetic
* Solve problems using matrices
 |
| Week 10(4 hours) | Topic 1.3Shape and measurement | **Pythagoras’ Theorem** (1.3.1)* Solve problems in 2 and 3 dimensions using Pythagoras’ theorem
 |
| Weeks 11–12(8 hours) | Topic 1.3Shape and measurement | **Mensuration** (1.3.2 – 1.3.4)* Perimeter and area of 2-D shapes, including sectors and other composite shapes
* Volume of standard objects such as prisms, pyramids, cones, spheres, practical applications
* Surface area, standard and composite shapes, practical applications
 |
| Weeks 13–14(8 hours) | Topic 1.3Shape and measurement | **Similar figures and scale factors** (1.3.5 – 1.3.8)* Conditions of similarity, similar triangles
* Scale factors and linear scaling problems
* Scale drawings (maps and building plans),problem solving
* Scale factors and areas of similar figures
* Scale factors and surface area/volume of similar solids
 |
| Week 15 | **Revision/end of Unit 1 assessment** |

# Sample course outline

# Mathematics Applications – ATAR Year 11

## Unit 2

In Unit 2 students will be provided with opportunities to:

* understand the concepts and techniques used in univariate data analysis and the statistical process, linear equations and their graphs, and applications of trigonometry
* apply reasoning skills and solve practical problems in univariate data analysis and the statistical process, linear equations and their graphs, and the applications of trigonometry
* implement the statistical investigation process in contexts requiring the analysis of univariate data
* communicate their arguments and strategies, when solving mathematical and statistical problems, using appropriate mathematical or statistical language
* interpret mathematical and statistical information, and ascertain the reasonableness of their solutions to problems and answers to statistical questions
* choose and use technology appropriately and efficiently.

This course outline assumes an allocation of 4 hours contact time per week for the course.

#### Each semester is based on a 15 week block.

| **Time placement (and allocation)** | **Topic/s** | **Key teaching points** |
| --- | --- | --- |
| **Semester 2 (Unit 2 – plus review of Unit 1)** |
| Weeks 16–20(18 hours) | Topic 2.1 Univariate data analysis and the statistical investigation process | **The statistical investigation process** (2.1.1)* Identifying a problem and posing a statistical question
* Collecting or obtaining data
* Analysing the data
* Interpreting and communicating the results

**Making sense of data relating to a single statistical variable**(2.1.2 – 2.1.9)* Classifying categorical variables – organising the data
* Classifying numerical variables (discrete/continuous) – describe the distribution, modality, shape, location and spread – interpret in context
* Mean and standard deviation (using technology)
* Deviations from the mean in normally distributed data
* Quantiles in normally distributed data, the 65%, 95% and 99.7% rule, calculating probabilities for normal distributions
 |
| Week 20–22(7 hours) | Topic 2.1Univariate data analysis and the statistical investigation process | **Comparing data for a numerical variable across two or more groups**(2.1.10 – 2.1.12)* Box plots, outliers
* Compare groups, interpret and report findings
* The statistical process for comparing groups
 |
| Week 22–24(10 hours) | Topic 2.2Applications of trigonometry | **Applications of trigonometry** (2.2.1 – 2.2.4)* Trigonometry of the right triangle
* Area of triangles, Heron’s rule and solution of practical problems
* Sine and cosine rule and application to problems (excluding ambiguous case)
* Solve practical problems involving right-angled and non-right-angled triangles, including problems involving angles of elevation and depression and the use of bearings in navigation
 |
| Week 24–27(10 hours) | Topic 2.3Linear equations and their graphs | **Linear equations** (2.3.1 – 2.3.2)* Identify and solve linear equations
* Word problems

**Straight-line graphs and their applications** (2.3.3 – 2.3.6)* Construction of graphs
* Gradient and intercepts, model linear relationships
* Interpret graphs and analyse practical situations
 |
| Week 27–29(10 hours) | Topic 2.3Linear equations and their graphs | **Simultaneous linear equations and their applications** (2.3.7 – 2.3.8)* Solving simultaneous equations – graphically, algebraically and using technology appropriately
* Solve practical problems

**Piece-wise linear graphs and step graphs** (2.3.9 – 2.3.10)* Sketch piece-wise linear graphs, step graphs
* Interpret and use to model practical situations
 |
| Week 29–30 | **Revision/end of course assessment** |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Hours allocated** | Consumer arithmetic | Algebra and matrices | Shape and measurement | Univariate data analysis | Applications of trigonometry | Linear equations and their graphs | Total |
| In this program | 20 | 15 | 20 | 25 | 10 | 20 | 110 |
| Suggested in the syllabus | 20 | 15 | 20 | 25 | 10 | 20 | 110 |