# The Australian
# **Curriculum**

| Subjects | Mathematics |
|---|---|
| **Year levels** | Year 10 |

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# Year 10 Content Descriptions

## Number and Algebra

### Money and financial mathematics

Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies (ACMNA229 - Scootle ↗)

Elaborations

working with authentic information, data and interest rates to calculate compound interest and solve related problems

### Patterns and algebra

Factorise algebraic expressions by taking out a common algebraic factor (ACMNA230 - Scootle ↗)

Elaborations

using the distributive law and the index laws to factorise algebraic expressions

understanding the relationship between factorisation and expansion

Simplify algebraic products and quotients using index laws (ACMNA231 - Scootle ↗)

Elaborations

applying knowledge of index laws to algebraic terms, and simplifying algebraic expressions using both positive and negative integral indices
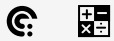
Apply the four operations to simple algebraic fractions with numerical denominators (ACMNA232 - Scootle ↗)

Elaborations

expressing the sum and difference of algebraic fractions with a common denominator

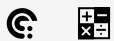using the index laws to simplify products and quotients of algebraic fractions

Expand binomial products and factorise monic quadratic expressions using a variety of strategies (ACMNA233 - Scootle ↗)

Elaborations

exploring the method of completing the square to factorise quadratic expressions and solve quadratic equations

identifying and using common factors, including binomial expressions, to factorise algebraic expressions using the technique of grouping in pairs

using the identities for perfect squares and the difference of squares to factorise quadratic expressions

Substitute values into formulas to determine an unknown (ACMNA234 - Scootle ↗)

Elaborations

solving simple equations arising from formulas

## Linear and non-linear relationships

Solve problems involving linear equations, including those derived from formulas (ACMNA235 - Scootle ↗)

Elaborations

representing word problems with simple linear equations and solving them to answer questions

Solve linear inequalities and graph their solutions on a number line (ACMNA236 - Scootle ↗)

[icon]

Elaborations

representing word problems with simple linear inequalities and solving them to answer questions

[icons]

Solve linear simultaneous equations, using algebraic and graphical techniques, including using digital technology (ACMNA237 - Scootle ↗)

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Elaborations

associating the solution of simultaneous equations with the coordinates of the intersection of their corresponding graphs

[icons]

Solve problems involving parallel and perpendicular lines (ACMNA238 - Scootle ↗)

[icons]

Elaborations

solving problems using the fact that parallel lines have the same gradient and conversely that if two lines have the same gradient then they are parallel

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solving problems using the fact that the product of the gradients of perpendicular lines is –1 and conversely that if the product of the gradients of two lines is –1 then they are perpendicular

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Explore the connection between algebraic and graphical representations of relations such as simple quadratics, circles and exponentials using digital technology as appropriate (ACMNA239 - Scootle ↗)

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Elaborations

sketching graphs of parabolas, and circles

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applying translations, reflections and stretches to parabolas and circles

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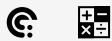sketching the graphs of exponential functions using transformations

Solve linear equations involving simple algebraic fractions (ACMNA240 - Scootle ↗)

Elaborations

solving a wide range of linear equations, including those involving one or two simple algebraic fractions, and checking solutions by substitution

representing word problems, including those involving fractions, as equations and solving them to answer the question
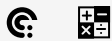
Solve simple quadratic equations using a range of strategies (ACMNA241 - Scootle ↗)

Elaborations

using a variety of techniques to solve quadratic equations, including grouping, completing the square, the quadratic formula and choosing two integers with the required product and sum
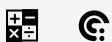
## Measurement and Geometry

### Using units of measurement

Solve problems involving surface area and volume for a range of prisms, cylinders and composite solids (ACMMG242 - Scootle ↗)

Elaborations

investigating and determining the volumes and surface areas of composite solids by considering the individual solids from which they are constructed
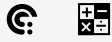
### Geometric reasoning

Formulate proofs involving congruent triangles and angle properties (ACMMG243 - Scootle ↗)

**Elaborations**

applying an understanding of relationships to deduce properties of geometric figures (for example the base angles of an isosceles triangle are equal)

Apply logical reasoning, including the use of congruence and similarity, to proofs and numerical exercises involving plane shapes (ACMMG244 - Scootle ↗)

**Elaborations**

distinguishing between a practical demonstration and a proof (for example demonstrating triangles are congruent by placing them on top of each other, as compared to using congruence tests to establish that triangles are congruent)
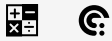
performing a sequence of steps to determine an unknown angle giving a justification in moving from one step to the next.
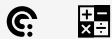
communicating a proof using a sequence of logically connected statements

### Pythagoras and trigonometry

Solve right-angled triangle problems including those involving direction and angles of elevation and depression (ACMMG245 - Scootle ↗)

**Elaborations**

applying Pythagoras' Theorem and trigonometry to problems in surveying and design

## Statistics and Probability

### Chance

Describe the results of two- and three-step chance experiments, both with and without replacements,

assign probabilities to outcomes and determine probabilities of events. Investigate the concept of independence (ACMSP246 - Scootle ↗)

### Elaborations

recognising that an event can be dependent on another event and that this will affect the way its probability is calculated
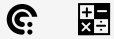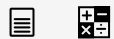
Use the language of 'if ....then, 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language (ACMSP247 - Scootle ↗)
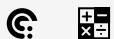
### Elaborations

using two-way tables and Venn diagrams to understand conditional statements

using arrays and tree diagrams to determine probabilities

## Data representation and interpretation

Determine quartiles and interquartile range (ACMSP248 - Scootle ↗)

### Elaborations

finding the five-number summary (minimum and maximum values, median and upper and lower quartiles) and using its graphical representation, the box plot, as tools for both numerically and visually comparing the centre and spread of data sets
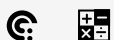
Construct and interpret box plots and use them to compare data sets (ACMSP249 - Scootle ↗)

### Elaborations

understanding that box plots are an efficient and common way of representing and summarising data and can facilitate comparisons between data sets

using parallel box plots to compare data about the age distribution of Aboriginal and Torres Strait Islander people with that of the Australian population as a whole

Compare shapes of box plots to corresponding histograms and dot plots (ACMSP250 - Scootle ↗)

Elaborations

investigating data in different ways to make comparisons and draw conclusions

Use scatter plots to investigate and comment on relationships between two numerical variables (ACMSP251 - Scootle ↗)

Elaborations

using authentic data to construct scatter plots, make comparisons and draw conclusions

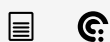Investigate and describe bivariate numerical data where the independent variable is time (ACMSP252 - Scootle ↗)
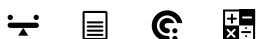
Elaborations

investigating biodiversity changes in Australia since European occupation

constructing and interpreting data displays representing bivariate data over time
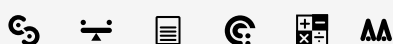
Evaluate statistical reports in the media and other places by linking claims to displays, statistics and representative data (ACMSP253 - Scootle ↗)

Elaborations

investigating the use of statistics in reports regarding the growth of Australia's trade with other countries of the Asia region

evaluating statistical reports comparing the life expectancy of Aboriginal and Torres Strait Islander people with that of the Australian population as a whole

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