Mathematics v8.1

Year 10 Syllabus

Year Level Description

The proficiency strands **understanding, fluency, problem-solving** and **reasoning** are an integral part of mathematics content across the three content strands: number and algebra, measurement and geometry, and statistics and probability. The proficiencies reinforce the significance of working mathematically within the content and describe how the content is explored or developed. They provide the language to build in the developmental aspects of the learning of mathematics. The achievement standards reflect the content and encompass the proficiencies.

At this year level:

- **understanding** includes applying the four operations to algebraic fractions, finding unknowns in formulas after substitution, making the connection between equations of relations and their graphs, comparing simple and compound interest in financial contexts and determining probabilities of two- and three-step experiments
- **fluency** includes factorising and expanding algebraic expressions, using a range of strategies to solve equations and using calculations to investigate the shape of data sets
- **problem-solving** includes calculating the surface area and volume of a diverse range of prisms to solve practical problems, finding unknown lengths and angles using applications of trigonometry, using algebraic and graphical techniques to find solutions to simultaneous equations and inequalities and investigating independence of events
- **reasoning** includes formulating geometric proofs involving congruence and similarity, interpreting and evaluating media statements and interpreting and comparing data sets.

Number and Algebra

MONEY AND FINANCIAL MATHEMATICS

Measurement and Geometry

USING UNITS OF MEASUREMENT

Statistics and Probability

CHANCE

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

Numeracy

Information and Communication Technology (ICT) capability

PATTERNS AND ALGEBRA

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

Numeracy

Simplify algebraic products and quotients using index laws (ACMNA231)

Numeracy

Apply the four operations to simple algebraic fractions with numerical denominators (ACMNA232)

Numeracy

Critical and creative thinking

Expand binomial products and factorise monic quadratic expressions

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

Literacy

Numeracy

GEOMETRIC REASONING

Formulate proofs involving congruent triangles and angle properties (ACMMG243)

Numeracy

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

Numeracy

PYTHAGORAS AND TRIGONOMETRY

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

Literacy

Numeracy

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)

Literacy

Numeracy

Critical and creative thinking

Use the language of 'if ....then', 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language (ACMSP247)

Literacy

Numeracy

DATA REPRESENTATION AND INTERPRETATION

Determine quartiles and interquartile range (ACMSP248)

Construct and interpret box plots and use them to compare data sets (ACMSP249)

Literacy

Numeracy

using a variety of strategies (ACMNA233)

Numeracy

Substitute values into formulas to determine an unknown (ACMNA234)

Numeracy

LINEAR AND NON-LINEAR RELATIONSHIPS

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

Numeracy

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

Numeracy

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

Numeracy

Information and Communication Technology (ICT) capability

Solve problems involving parallel and perpendicular

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

Literacy

Numeracy

Critical and creative thinking

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

Literacy

Numeracy

Critical and creative thinking

Investigate and describe bivariate numerical data where the independent variable is time (ACMSP252)

Literacy

Numeracy

Critical and creative thinking

Evaluate statistical reports in the media and other places by linking claims to displays, statistics and representative data (ACMSP253)

lines (ACMNA238)

Literacy

Numeracy

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

Literacy

Numeracy

Information and Communication Technology (ICT) capability

Solve linear equations involving simple algebraic fractions (ACMNA240)

Numeracy

Solve simple quadratic equations using a range of strategies (ACMNA241)

Numeracy

Critical and creative thinking

Literacy

Numeracy

Critical and creative thinking

Ethical understanding

Year 10A Syllabus

Number and Algebra

REAL NUMBERS

Define rational and irrational numbers and perform operations with surds and fractional indices (ACMNA264)

Numeracy

Critical and creative thinking

Use the definition of a logarithm to establish and apply the laws of logarithms (ACMNA265)

Numeracy

Critical and creative thinking

PATTERNS AND ALGEBRA

Investigate the concept of a polynomial and apply the factor and remainder theorems to solve problems (ACMNA266)

Numeracy

Critical and creative thinking

LINEAR AND NON-LINEAR

Measurement and Geometry

USING UNITS OF MEASUREMENT

Solve problems involving surface area and volume of right pyramids, right cones, spheres and related composite solids (ACMMG271)

Numeracy

Critical and creative thinking

GEOMETRIC REASONING

Prove and apply angle and chord properties of circles (ACMMG272)

Numeracy

Critical and creative thinking

PYTHAGORAS AND TRIGONOMETRY

Establish the sine, cosine and area rules for any triangle and solve related problems (ACMMG273)

Numeracy

Critical and creative

Statistics and Probability

CHANCE

Investigate reports of studies in digital media and elsewhere for information on their planning and implementation (ACMSP277)

Literacy

Numeracy

Information and Communication Technology (ICT) capability

Critical and creative thinking

DATA REPRESENTATION AND INTERPRETATION

Calculate and interpret the mean and standard deviation of data and use these to compare data sets (ACMSP278)

Numeracy

Critical and creative thinking

Use information technologies to investigate bivariate numerical data

RELATIONSHIPS

Describe, interpret and sketch parabolas, hyperbolas, circles and exponential functions and their transformations (ACMNA267)

Numeracy

Critical and creative thinking

Solve simple exponential equations (ACMNA270)

Numeracy

Critical and creative thinking

Apply understanding of polynomials to sketch a range of curves and describe the features of these curves from their equation (ACMNA268)

Numeracy

Critical and creative thinking

Factorise monic and non-monic quadratic expressions and solve a wide range of quadratic equations derived from a variety of contexts (ACMNA269)

thinking

Use the unit circle to define trigonometric functions, and graph them with and without the use of digital technologies (ACMMG274)

Numeracy

Information and Communication Technology (ICT) capability

Critical and creative thinking

Solve simple trigonometric equations (ACMMG275)

Numeracy

Critical and creative thinking

Apply Pythagoras' Theorem and trigonometry to solving three-dimensional problems in right-angled triangles (ACMMG276)

Numeracy

sets. Where appropriate use a straight line to describe the relationship allowing for variation (ACMSP279)

Numeracy

Information and Communication Technology (ICT) capability

Critical and creative thinking

Numeracy

Critical and creative thinking