Year 9 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 describing the relationship between graphs and equations, simplifying a range of algebraic expressions and explaining the use of relative frequencies to estimate probabilities and of the trigonometric ratios for right-angle triangles
- fluency includes applying the index laws to expressions with integer indices, expressing numbers in scientific notation, listing outcomes for experiments, developing familiarity with calculations involving the Cartesian plane and calculating areas of shapes and surface areas of prisms
- problem-solving includes formulating and modelling practical situations involving surface areas and volumes of right prisms, applying ratio and scale factors to similar figures, solving problems involving right-angle trigonometry and collecting data from secondary sources to investigate an issue

 reasoning includes following mathematical arguments, evaluating media reports and using statistical knowledge to clarify situations, developing strategies in investigating similarity and sketching linear graphs.

Number and Algebra

REAL NUMBERS

Solve problems involving direct proportion. Explore the relationship between graphs and equations corresponding to simple rate problems (ACMNA208)

■ Literacy

Rest Numeracy

Critical and creative thinking

Apply index laws to numerical expressions with integer indices (ACMNA209)

Rest Numeracy

Measurement and Geometry

USING UNITS OF MEASUREMENT

Calculate areas of composite shapes (ACMMG216)

Numeracy

Calculate the surface area and volume of cylinders and solve related problems (ACMMG217)

Literacy

Rest Numeracy

Critical and creative thinking

Solve problems involving the surface area and volume of right prisms

Statistics and Probability

CHANCE

List all outcomes for two-step chance experiments, both with and without replacement using tree diagrams or arrays. Assign probabilities to outcomes and determine probabilities for events (ACMSP225)

Numeracy №

Calculate relative frequencies from given or collected data to estimate probabilities of events involving 'and' or 'or' (ACMSP226)

Express numbers in scientific notation (ACMNA210)

Numeracy

MONEY AND FINANCIAL MATHEMATICS

Solve problems involving simple interest <u>(ACMNA211)</u>

Literacy

Rest Numeracy

Critical and creative thinking

PATTERNS AND ALGEBRA

Extend and apply the index laws to variables, using positive integer indices and the zero index (ACMNA212)

Numeracy Numeracy

Apply the distributive law to the expansion of algebraic expressions, including

(ACMMG218)

■ Literacy

Numeracy

Critical and creative

thinking

Investigate very small and very large time scales and intervals (ACMMG219)

Numeracy

GEOMETRIC REASONING

Use the enlargement transformation to explain similarity and develop the conditions for triangles to be similar (ACMMG220)

Literacy

Numeracy

Solve problems using ratio and scale factors in similar figures (ACMMG221) ■ Literacy

Remain Numeracy

Investigate reports of surveys in digital media and elsewhere for information on how data were obtained to estimate population means and medians <u>(ACMSP227)</u>

Literacy

Real Numeracy

🗼 Information and

Communication

Technology (ICT)

capability

Critical and creative

thinking

🛨 Ethical understanding

DATA REPRESENTATION AND INTERPRETATION

Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collect binomials, and collect like terms where appropriate (ACMNA213)

Numeracy

LINEAR AND NON-LINEAR RELATIONSHIPS

Find the distance between two points located on the Cartesian plane using a range of strategies, including graphing software <u>(ACMNA214)</u>

Ref Numeracy

Information and
Communication
Technology (ICT)
capability

Find the midpoint and gradient of a line segment (interval) on the Cartesian plane using a range of strategies, including graphing software (ACMNA294) ■ Literacy

Rest Numeracy

Critical and creative

thinking

PYTHAGORAS AND TRIGONOMETRY

Investigate Pythagoras' Theorem and its application to solving simple problems involving right-angled triangles (ACMMG222)

Literacy

Numeracy

Use similarity to investigate the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles (ACMMG223)

Numeracy

Apply trigonometry to solve right-angled triangle problems data directly and from secondary sources (ACMSP228)

Literacy

Numeracy

Critical and creative

thinking

🛨 Ethical understanding

Construct back-toback stem-and-leaf plots and histograms and describe data, using terms including 'skewed', 'symmetric' and 'bi modal' (ACMSP282)

Real Numeracy

Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread (ACMSP283)

Literacy

Rest Numeracy

Numeracy

Information and
Communication
Technology (ICT)
capability

Sketch linear graphs using the coordinates of two points and solve linear equations (ACMNA215)

Kalanti Numeracy

Critical and creative thinking

Graph simple nonlinear relations with and without the use of digital technologies and solve simple related equations (ACMNA296)

- Literacy
- Numeracy
- 🗼 Information and
- Communication

Technology (ICT)

capability

(ACMMG224)

Literacy

Rumeracy

Critical and creative

thinking

Year 9 Achievement Standard

Number and Algebra

At Standard, students solve problems involving simple interest. They apply the index laws to numbers and express numbers in scientific notation. Students expand binomial expressions. They find the distance between two points on the Cartesian plane and the gradient and midpoint of a line segment. Students sketch linear and non-linear relations.

Measurement and Geometry

Students interpret ratio and scale factors in similar figures. They explain similarity of triangles. Students recognise the connections between similarity and the trigonometric ratios. They calculate areas of shapes and the volume and surface area of right prisms and cylinders. Students use Pythagoras' Theorem and trigonometry to find unknown sides of rightangled triangles.

Statistics and Probability

Students calculate relative frequencies to estimate probabilities, list outcomes for two-step experiments and assign probabilities for those outcomes. They compare techniques for collecting data from primary and secondary sources. Students construct histograms and back-to-back stemand-leaf plots. They make sense of the position of the mean and median in skewed, symmetric and bi-modal displays to describe and interpret data.

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