Work Program

7-10 Mathematics

Contents

1   RATIONALE (ACARA, 2014)

Rationale

Learning mathematics creates opportunities for and enriches the lives of all Australians. The Australian Curriculum: Mathematics provides students with essential mathematical skills and knowledge in Number and Algebra, Measurement and Geometry, and Statistics and Probability. It develops the numeracy capabilities that all students need in their personal, work and civic life, and provides the fundamentals on which mathematical specialties and professional applications of mathematics are built.

Mathematics has its own value and beauty and the Australian Curriculum: Mathematics aims to instil in students an appreciation of the elegance and power of mathematical reasoning. Mathematical ideas have evolved across all cultures over thousands of years, and are constantly developing. Digital technologies are facilitating this expansion of ideas and providing access to new tools for continuing mathematical exploration and invention. The curriculum focuses on developing increasingly sophisticated and refined mathematical understanding, fluency, logical reasoning, analytical thought and problem-solving skills. These capabilities enable students to respond to familiar and unfamiliar situations by employing mathematical strategies to make informed decisions and solve problems efficiently.

The Australian Curriculum: Mathematics ensures that the links between the various components of mathematics, as well as the relationship between mathematics and other disciplines, are made clear. Mathematics is composed of multiple but interrelated and interdependent concepts and systems which students apply beyond the mathematics classroom. In science, for example, understanding sources of error and their impact on the confidence of conclusions is vital, as is the use of mathematical models in other disciplines. In geography, interpretation of data underpins the study of human populations and their physical environments; in history, students need to be able to imagine timelines and time frames to reconcile related events; and in English, deriving quantitative and spatial information is an important aspect of making meaning of texts.

The curriculum anticipates that schools will ensure all students benefit from access to the power of mathematical reasoning and learn to apply their mathematical understanding creatively and efficiently. The mathematics curriculum provides students with carefully paced, in-depth study of critical skills and concepts. It encourages teachers to help students become self-motivated, confident learners through inquiry and active participation in challenging and engaging experiences.

Aims

The Australian Curriculum: Mathematics aims to ensure that students:
   ★ are confident, creative users and communicators of mathematics, able to investigate, represent and interpret situations in their personal and work lives and as active citizens
   ★ develop an increasingly sophisticated understanding of mathematical concepts and fluency with processes, and are able to pose and solve problems and reason in Number and Algebra, Measurement and Geometry, and Statistics and Probability
   ★ recognise connections between the areas of mathematics and other disciplines and appreciate mathematics as an accessible and enjoyable discipline to study.

2   ORGANISATION

Content strands

Number and Algebra are developed together, as each enriches the study of the other. Students apply number sense and strategies for counting and representing numbers. They explore the magnitude and properties of numbers. They apply a range of strategies for computation and understand the connections between operations. They recognise patterns and understand the concepts of variable and function. They build on their understanding of the number system to describe relationships and formulate generalisations. They recognise equivalence and solve equations and inequalities. They apply their number and algebra skills to conduct investigations, solve problems and communicate their reasoning.

Measurement and Geometry are presented together to emphasise their relationship to each other, enhancing their practical relevance. Students develop an increasingly sophisticated understanding of size, shape, relative position and movement of two-dimensional figures in the plane and three-dimensional objects in space. They investigate properties and apply their understanding of them to define, compare and construct figures and objects. They learn to develop geometric arguments. They make meaningful measurements of quantities, choosing appropriate metric units of measurement. They build an understanding of the connections between units and calculate derived measures such as area, speed and density.
Statistics and Probability

Statistics and Probability initially develop in parallel and the curriculum then progressively builds the links between them. Students recognise and analyse data and draw inferences. They represent, summarise and interpret data and undertake purposeful investigations involving the collection and interpretation of data. They assess likelihood and assign probabilities using experimental and theoretical approaches. They develop an increasingly sophisticated ability to critically evaluate chance and data concepts and make reasoned judgments and decisions, as well as building skills to critically evaluate statistical information and develop intuitions about data.

Sub-strands

Number & Algebra	Measurement & Geometry	Statistics & Probability
Number & place (F-8)	Using units of measurement (F-10)	Chance (1-10)
Fractions & decimals (1-6)	Shape (F-7)	Data representation & interpretation (F-10)
Real numbers (7-10)	Geometric reasoning (F-7)	
Money & financial mathematics (1-10)	Location & transformation (F-7)	
Patterns & algebra (F-10)	Pythagoras & trigonometry (9-10)	
Linear & non-linear relationships (8-10)		

Mathematics Years 7–10: typically students from 12 to 15 years of age
These years of school mark a shift in mathematics learning to more abstract ideas. Through key activities such as the exploration, recognition and application of patterns, the capacity for abstract thought can be developed and the ways of thinking associated with abstract ideas can be illustrated.

The intent of the curriculum is to encourage the development of important ideas in more depth, and to promote the interconnectedness of mathematical concepts. An obvious concern is the preparation of students intending to continue studying mathematics in the senior secondary years. Teachers will, in implementing the curriculum, extend the more mathematically able students by using appropriate challenges and extensions within available topics. The 10A content is optional and is intended for students who require more content to enrich their mathematical study whilst completing the common Year 10 content. It is NOT anticipated that all students will attempt the 10A content, but doing so would be advantageous for students intending to pursue Mathematical Methods (Course C) or Specialist Mathematics (Course D) in the senior secondary years.

Proficiency strands

The proficiency strands describe the actions in which students can engage when learning and using the content. While not all proficiency strands apply to every content description, they indicate the breadth of mathematical actions that teachers can emphasise.

Understanding. Students build a robust knowledge of adaptable and transferable mathematical concepts. They make connections between related concepts and progressively apply the familiar to develop new ideas. They develop an understanding of the relationship between the 'why' and the 'how' of mathematics. Students build understanding when they connect related ideas, when they represent concepts in different ways, when they identify commonalities and differences between aspects of content, when they describe their thinking mathematically and when they interpret mathematical information.

Fluency. Students develop skills in choosing appropriate procedures, carrying out procedures flexibly, accurately, efficiently and appropriately, and recalling factual knowledge and concepts readily. Students are fluent when they calculate answers efficiently, when they recognise robust ways of answering questions, when they choose appropriate methods and approximations, when they recall definitions and regularly use facts, and when they can manipulate expressions and equations to find solutions.

Problem Solving. Students develop the ability to make choices, interpret, formulate, model and investigate problem situations, and communicate solutions effectively. Students formulate and solve problems when they use mathematics to represent unfamiliar or meaningful situations, when they design investigations and plan their approaches, when they apply their existing strategies to seek solutions, and when they verify that their answers are reasonable.

Reasoning. Students develop an increasingly sophisticated capacity for logical thought and actions, such as analysing, proving, evaluating, explaining, inferring, justifying and generalising. Students are reasoning mathematically when they explain their thinking, when they deduce and justify strategies used and conclusions reached, when they adapt the known to the unknown, when they transfer learning from one context to another, when they prove that something is true or false and when they compare and contrast related ideas and explain their choices.

Cross-curriculum priorities

Aboriginal and Torres Strait Islander histories and cultures
Asia and Australia's engagement with Asia
Sustainability.

Links to the other learning areas

Learning in mathematics involves the use of knowledge and skills learnt in other areas, particularly in English, science and history.

3   COURSE ORGANISATION

Time allocation
The number of hours of timetabled school time including assessment for this course of study is approximately 30 hours per term for each of Years 7, 8, 9, and 10.

Year 7 Term 1
Chapter 1   Number 1 (Number & Algebra - Real Numbers)
- ★ Express one quantity as a fraction of another ACMNA155
- ★ Connect fractions, decimals and percentages and carry out simple conversions ACMNA157
- ★ Find percentages of quantities and express one quantity as a percentage of another ACMNA158
- ★ Justify choice of written, mental or calculator strategies for solving specific problems including those involving large numbers

Chapter 2   Area (Measurement & Geometry - Using Units of Measurement)
- ★ Establish the formulas for areas of rectangles, triangles and parallelograms and use these in problem solving ACMMG159
- ★ Use area formulas for rectangles and triangles to solve problems involving areas of surfaces

Chapter 3   Probability (Statistics & Probability - Chance)
- ★ Discuss the meaning of probability terminology (for example probability, sample space, favourable outcomes, trial, chance events and experiments).
- ★ Construct sample spaces for single-step experiments with equally likely outcomes ACMSP167
- ★ Express probabilities in common and decimal fractional and percentage forms.
- ★ Understand the advantages and limitations of calculating theoretical probabilities.

Chapter 4   Money (Number & Algebra - Money & Financial Mathematics)
- ★ Find percentages of quantities and express one quantity as a percentage of another ACMNA158
- ★ Use authentic problems to express quantities as percentages of other amounts.
- ★ Investigate and calculate 'best buys' ACMNA174

Chapter 5   Review
- ★ All of above

Year 7 Term 2
Chapter 6   Number 2 (Number & Algebra - Real Numbers)
- ★ Compare fractions using equivalence (by using a fraction wall or a number line) ACMNA152
- ★ Solve problems involving addition and subtraction of fractions ACMNA153
- ★ Multiply and divide fractions ACMNA154

Chapter 7   Algebra (Number & Algebra - Patterns & Algebra)
- ★ Introduce the concept of variables ACMNA175
- ★ Move fluently between algebraic and word representations.
- ★ Create algebraic expressions and perform substitutions ACMNA176
- ★ Identify order of operations.
- ★ Apply the commutative and associative laws to algebraic terms and expressions ACMNA177

Chapter 8   Volume (Measurement & Geometry - Using Units of Measurement)
- ★ Calculate volumes of rectangular prisms ACMG160
- ★ Investigate volumes of cubes and rectangular prisms.
- ★ Establish and use the formula $V = l \times b \times h$.
- ★ Understand and use cubic units when finding volumes of cubes and rectangular prisms.

Chapter 9   Coordinates (Number & Algebra - Number & Place Value - Linear & Non-linear)
- ★ Compare, order, add and subtract integers ACMNA280
- ★ Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point ACMNA178
- ★ Plot points from a table of integer values.
- ★ Recognise simple patterns, such as points that lie on a straight line.

Chapter 10   Review
- ★ All of above

Year 7 Term 3

Chapter 11   Number 3 (Number & Algebra - Number & Place Value)
- ★ Investigate index notation and represent whole numbers as products of powers of prime numbers ACMNA149
- ★ Define and compare prime and composite numbers.
- ★ Express whole numbers as products of powers of prime factors (factor trees).
- ★ Solve problems involving lowest common multiples and greatest common divisors (highest common factors).
- ★ Investigate square numbers such as 25 and 36 and developing square-root notation.
- ★ Investigate between which two whole numbers a square root lies.

Chapter 12   Linear Equations (Number & Algebra - Linear & Non-linear Relationships)
- ★ Solve simple linear equations   ACMNA179
- ★ Use strategies such as backtracking and guess, check and improve to solve equations.
- ★ Use substitution to check solutions.
- ★ Solve real life problems.
- ★ Create linear relationships to represent realistic situations.

Chapter 13   Geometry (Measurement & Geometry - Geometric Reasoning)
- ★ Define and classifying angles such as acute, right, obtuse, straight, reflex and revolution, and pairs of angles such as complementary, supplementary, adjacent and vertically opposite.
- ★ Construct parallel and perpendicular lines.
- ★ Identify corresponding, alternate, and co-interior angles when two straight lines are crossed by a transversal ACMMG163
- ★ Demonstrate that the angle sum of a triangle is 180° and use this to find the angle sum of a quadrilateral ACMMG166
- ★ Classify triangles according to their side and angle properties and describe quadrilaterals ACMMG165

Chapter 14   Data 1 (Statistics & Probability - Data Representation & Interpretation)
- ★ Calculate mean, median, mode and range for sets of data   ACMSP171
- ★ Use ordered stem-and-leaf plots to record and display numerical data.
- ★ Describe and interpret data displays using median, mean and range   ACMSP172
- ★ Locate mean, median and range on graphs and connect them to real life.

Chapter 15   Review
- ★ All of above

Year 7 Term 4

Chapter 16   Ratio & Rate (Number & Algebra - Real Numbers)
- ★ Recognise and solve problems involving simple ratios   ACMNA173
- ★ Understand that rate and ratio problems can be solved using fractions or percentages and choosing the most efficient form to solve a particular problem.
- ★ Find percentages of quantities and express one quantity as a percentage of another   ACMNA158
- ★ Use authentic problems to express quantities as percentages of other amounts.

Chapter 17   Linear Equations (Number & Algebra - Linear & Non-linear Relationships)
- ★ Solve simple linear equations   ACMNA179
- ★ Solve real-life problems by using pronumerals to represent unknowns.
- ★ Investigate, interpret and analyse graphs from authenic data   ACMNA180
- ★ Interpret features of travel graphs such as the slope of lines and the meaning of horizontal lines.
- ★ Use graphs of evaporation rates to explore water storage.

Chapter 18   Transformations (Measurement & Geometry - Location & Transformation)
- ★ Describe translations, reflections in an axis, and rotations of multiples of 90°   ACMMG181
- ★ Identify line and rotational symmetries   ACMMG181
- ★ Identify combinations of transformations that produce the same result.
- ★ Using digital technologies to experiment with patterns.

Chapter 19   Data 2 (Statistics & Probability - Data Representation & Interpretation)
- ★ Identify and investigate issues involving numerical data collected from primary and secondary sources ACMSP169
- ★ Construct and compare a range of data displays including stem-and-leaf plots and dot plots   ACMSP170
- ★ Investigate relationships between data.

Year 8 Term 1

Chapter 1   Index Laws (Number & Algebra - Number & place value)
- ★ Use index notation with numbers to establish the index laws with positive integral indices and the zero index.
- ★ Evaluate numbers expressed as powers of positive integers.

Chapter 2   Integers (Number & Algebra - Integers)
- ★ Carry out the four operations with integers.
- ★ Use efficient mental and written strategies.
- ★ Use appropriate digital technologies.

Chapter 3   Algebra (Number & Algebra - Patterns & Algebra)
- ★ Extend and apply the distributive law to the expansion of algebraic expressions.
- ★ Factorise algebraic expressions by identifying (highest common factor) of numeric and algebraic expressions.
- ★ Simplify algebraic expressions involving the four operations.

Chapter 4   Probability (Statistics & Probability - Chance)
- ★ Understand that probabilities range between 0 to 1.
- ★ Identify complementary events.
- ★ Identify the complement of familiar events.
- ★ Use the sum of probabilities to solve problems.

Chapter 5   Review
- ★ All of above

Year 8 Term 2

Chapter 6   Real Numbers (Number & Algebra - Real Numbers)
- ★ Recognise terminating, recurring and non-terminating decimals and choose their appropriate representations.
- ★ Investigate the concept of irrational numbers, including π.
- ★ Understand that the real number system includes irrational numbers and that certain subsets of the real number system have particular properties.

Chapter 7   Congruence (Measurement & Geometry - Congruence)
- ★ Two figures are congruent if one shape lies exactly on top of the other after one or more transformations (translation, reflection, rotation).
- ★ Solve problems using properties of congruent figures, justifying reasoning and making generalisations.
- ★ The minimal conditions for congruence (SSS, SAS, ASA and RHS) and the conditions that do not prescribe congruence (ASS, AAA).
- ★ Plot the vertices of two-dimensional shapes on the Cartesian plane, translating, rotating or reflecting the shape and using coordinates to describe the transformation.

Chapter 8   Data (Statistics & Probability - Data Representation & Interpretation)
- ★ Use sample properties to predict characteristics of the population.
- ★ Use displays of data to explore and investigate effects.
- ★ Explore the practicalities and implications of obtaining representative data.
- ★ Understand that making decisions and drawing conclusions based on data may differ from those based on preferences and beliefs.
- ★ Investigate the effect of individual data values, including outliers, on the mean and median.

Chapter 9   Circles (Measurement & Geometry - Using Units of Measurement)
- ★ Investigate the relationship between features of circles such as circumference, area, radius and diameter.
- ★ Use formulas to solve problems involving circumference and area.
- ★ Investigate the circumference and area of circles with materials or by measuring, to establish an understanding of formulas.
- ★ Investigate the area of circles using a square grid or by rearranging a circle divided into sectors.

Chapter 10   Review
- ★ All of above

Year 8 Term 3

Chapter 11   Ratio & Rate (Number & Algebra - Real Numbers)
- ★ Use percentages to solve problems, including those involving mark-ups, discounts, profit and loss and GST.
- ★ Express profit and loss as a percentage of cost or selling price, compare the difference.
- ★ Investigate the methods used in retail stores to express discounts.
- ★ Solve a range of problems involving rates and ratios, with and without digital technologies
- ★ Understand that rate and ratio problems can be solved using fractions or percentages and choosing the most efficient form to solve a particular problem.
- ★ Calculate population rates in Australia and Asia and explain their difference.

Chapter 12   Linear Equations (Number & Algebra - Linear & Non-linear Relationships)
- ★ Solve linear equations using algebraic and graphical techniques.
- ★ Use variables to symbolise simple linear equations and use a variety of strategies to solve them.
- ★ Solve equations using concrete materials, such as the balance model, and explain the need to do the same thing to each side of the equation.

Chapter 13   Data (Statistics & Probability - Data Representation & Interpretation)
- ★ Explore the practicalities and implications of obtaining representative data.
- ★ Understand that making decisions and drawing conclusions based on data may differ from those based on preferences and beliefs.
- ★ Explore the variation of means and proportions in representative data.
- ★ Investigate an international issue where media reporting and the use of data reflects different cultural or social emphases.
- ★ Use sample properties to predict characteristics of the population.

Chapter 14   Time (Measurement & Geometry - Using Units of Measurement)
- ★ Solve problems involving duration, including using 12-hour and 24-hour time within a single time zone.
- ★ Calculate travel times given the start and finish time in 12-hour and 24-hour time including where the start and end time are in different time zones.
- ★ Identify regions in Australia and countries in Asia that are in the same time zone.

Chapter 15   Review
- ★ All of above

Year 8 Term 4

Chapter 16   Linear Relationships (Number & Algebra - Linear & Non-linear Relationships)
- ★ Plot linear relationships on the Cartesian plane.
- ★ Plot points for tables of values from non-rule-based data.
- ★ Solve linear equations using algebraic and graphical techniques.
- ★ Use variables to symbolise simple linear equations.

Chapter 17   Measurement (Measurement & Geometry - Using Units of Measurement)
- ★ Find perimeters and areas of parallelograms, rhombuses and kites.
- ★ Explore the use of parallelograms, rhombuses and kites in art and architecture.
- ★ Develop the formulas for volumes of rectangular and triangular prisms and prisms in general.
- ★ Use formulas to solve problems involving volume.
- ★ Investigate the relationship between volumes of rectangular and triangular prisms.

Chapter 18   Probability (Statistics & Probability - Chance)
- ★ Understand that representing data in Venn diagrams or two-way tables facilitates the calculation of probabilities.
- ★ Use Venn diagrams and two-way tables to calculate probabilities for events satisfying 'and', 'or', 'given' and 'not' conditions.
- ★ Pose 'and', 'or', 'not' and 'given' probability questions about objects or people.
- ★ Collect data to answer the questions using Venn diagrams or two-way tables.

Chapter 19   Congruence (Measurement & Geometry - Geometric Reasoning)
- ★ Develop the conditions for congruence of triangles.
- ★ Construct triangles using the conditions for congruence.
- ★ Solve problems using the properties of congruent figures.
- ★ Establish of the conditions for congruence (SSS, SAS, ASA and RHS) to solve problems.
- ★ Establish the properties of squares, rectangles, parallelograms, rhombuses, trapeziums and kites.

Chapter 20   Review
- ★ All of above

Year 9 Term 1
Chapter 1   Indices 1 (Number & Algebra - Real Numbers)
- ★ Apply index laws to numerical expressions with integer indices.
- ★ Connect different strategies for simplifying expressions with indices to illustrate the meaning of negative indices.
- ★ Move fluently between representations of numeric and algebraic terms with negative indices.
- ★ Apply knowledge of index laws to algebraic terms and simplify algebraic expressions, using both positive and negative integral indices.

Chapter 2   Algebra 1 (Number & Algebra - Patterns & Algebra)
- ★ Apply the distributive law to the expansion of algebraic expressions, including binomials, and collect like terms where appropriate.
- ★ Understand that the distributive law can be applied to algebraic expressions as well as numbers, and understanding the inverse relationship between expansion and factorisation.
- ★ Extend and apply the index laws to variables, using positive integral indices.

Chapter 3   Area (Measurement & Geometry - Using units of measurement)
- ★ Calculate the areas of composite shapes.
- ★ Understand that partitioning composite shapes into rectangles and triangles is a strategy for solving problems involving perimeter and area.
- ★ Analyse nets of prisms and cylinders to establish formulas for surface area.
- ★ Calculate the surface area of cylinders and right prisms and solve related problems.
- ★ Become fluent with calculation of area and identify that area is used in the workplace and everyday life.

Chapter 4   Graphs (Number & Algebra - Linear & Non-linear Relationships)
- ★ Sketch linear graphs using the coordinates of two points.
- ★ Determine linear rules from suitable diagrams, tables of values and graphs and describe them both using words and algebra.
- ★ Sketch parabolas, hyperbolas, circles.

Chapter 5   Review
- ★ All of above

Year 9 Term 2
Chapter 6   Proportion (Number & Algebra - Real Numbers)
- ★ Solve problems involving direct proportion.
- ★ Explore the relationship between graphs and equations corresponding to simple rate problems.
- ★ Understand the difference between direct and inverse proportion, identifying these in real-life contexts and using these relationships to solve problems.

Chapter 7   Pythagoras' Theorem (Measurement & Geometry - Pythagoras & trigonometry)
- ★ Investigate Pythagoras' Theorem and its application to solving simple problems involving right-angled triangles.
- ★ Understand that Pythagoras' Theorem is a useful tool in determining unknown lengths in right-angled triangles and has widespread applications.
- ★ Recognise that right-angled triangle calculations may generate results that can be integral, fractional or irrational numbers known as surds.

Chapter 8   Geometry (Measurement & Geometry - Geometric Reasoning)
- ★ Use the enlargement transformation to explain similarity and develop the conditions for triangles to be similar.
- ★ Solve problems using ratio and scale factors in similar figures.

Chapter 9   Statistics (Statistics & Probability - Data Representation & Interpretation)
- ★ Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collect data directly from secondary sources.
- ★ Construct back-to-back stem-and-leaf plots and histograms and describe data, using terms including 'skewed', 'symmetric' and 'bi modal'.
- ★ Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread.
- ★ investigating the usefulness of scientific notation in representing very large and very small numbers.

Chapter 10   Review
- ★ All of above

Year 9 Term 3
Chapter 11   Indices 2 (Number & Algebra - Real Numbers)
- ★ Express numbers in scientific notation.
- ★ Understand that the use of index notation is an efficient way of representing numbers and symbols and has many applications, particularly in science.
- ★ Represent extremely large and small numbers in scientific notation, and numbers expressed in scientific notation as whole numbers or decimals.
- ★ Apply index laws to numerical expressions with integer indices.
- ★ Apply knowledge of index laws to algebraic terms and simplify algebraic expressions, using both positive and negative integral indices.
- ★ Investigate very small and very large time scales and intervals.
- ★ Investigate the usefulness of scientific notation in representing very large and very small numbers.

Chapter 12   Trigonometry 1 (Measurement & Geometry - Pythagoras & Trigonometry)
- ★ Use similarity to investigate the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles.
- ★ Develop an understanding of the relationship between the corresponding sides of similar right-angled triangles.
- ★ Apply trigonometry to solve right-angled triangle problems.
- ★ Understand the terms 'adjacent' and 'opposite' sides in a right-angled triangle.

Chapter 13   Volume (Measurement & Geometry - Using Units of Measurement)
- ★ Calculate the volume of cylinders and solve related problems.
- ★ Solve problems involving the volume of right prisms.
- ★ Build on the understanding of volume to become fluent with calculation, and identify that volume relationships are used in the workplace and everyday life.

Chapter 14   Probability (Statistics & 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.
- ★ Calculate relative frequencies from given or collected data to estimate probabilities of events involving 'and' or 'or'.
- ★ Posing 'and', 'or', 'not' and 'given' probability questions about objects or people.
- ★ Collect data to answer the questions using Venn diagrams or two-way tables.

Chapter 15   Review
- ★ All of above

Year 9 Term 4
Chapter 16   Coordinate (Number & Algebra - Linear & Non-linear Relationships)
- ★ Find the distance between two points located on a Cartesian plane using a range of strategies, including graphing software.
- ★ Investigate graphical and algebraic techniques for finding distance.
- ★ Find the midpoint and gradient of a line segment (interval) on the Cartesian plane using a range of strategies.
- ★ Investigate graphical and algebraic techniques for finding midpoint and gradient.

Chapter 17   Trigonometry 2 (Measurement & Geometry - Pythagoras & Trigonometry)
- ★ Apply trigonometry to solve right-angled triangle problems.
- ★ Understand the terms 'adjacent' and 'opposite' sides in a right-angled triangle.
- ★ Select and accurately use the correct trigonometric ratio to find unknown sides and angles in right-angled triangles.

Chapter 18   Algebra 2 (Number & Algebra - Patterns & Algebra)
- ★ Apply the distributive law to the expansion of algebraic expressions, including binomials, and collect like terms where appropriate.
- ★ Understand that the distributive law can be applied to algebraic expressions as well as numbers, and understand the inverse relationship between expansion and factorisation.
- ★ Extend and apply the index laws to variables, using positive integral indices.

Chapter 19   Data (Statistics & Probability - Data Representation & Interpretation)
- ★ Investigate techniques for collecting data, including census, sampling and observation.
- ★ Investigate reports of surveys in digital media and elsewhere for information on how data were obtained to estimate population means and medians.

Chapter 20   Review
- ★ All of above

Year 10   Term 1

Chapter 1   Algebra 1 (Number & Algebra - Pattern & Algebra)
- ★ Factorise algebraic expressions by taking out a common algebraic factor.
- ★ Simplify algebraic products and quotients using index laws.
- ★ Apply the four operations to simple algebraic fractions with numerical denominators.

Chapter 2   Linear Equations (Number & Algebra - Linear Relationships)
- ★ Solve problems involving linear equations, including those derived from formulas.
- ★ Solve linear inequalities and graph their solutions on a number line.
- ★ Solve linear simultaneous equations, using algebraic and graphical techniques including using digital technology.

Chapter 3   Area & Volume (Measurement & Geometry - Using units of measurement)
- ★ Solve problems involving surface area and volume for a range of prisms, cylinders and composite solids.
- ★ **10A** Solve problems involving surface area and volume of right pyramids, right cones, spheres and related composite solids.

Chapter 4   Indices, Surds, Logs (Number & Algebra - Real Numbers)
- ★ **10A** Define rational and irrational numbers and perform operations with surds and fractional indices.
- ★ **10A** Use the definition of a logarithm to establish and apply the laws of logarithms.

Chapter 5   Review
- ★ All of above

Year 10   Term 2

Chapter 6   Quadratics (Number & Algebra - Patterns & Algebra)
- ★ Expand binomial products and factorise monic quadratic expressions using a variety of strategies.

Chapter 7   Solving Equations (Number & Algebra - Linear & Non-linear Relationships)
- ★ Solve linear equations involving simple algebraic fractions.
- ★ Solve simple quadratic equations using a range of strategies.

Chapter 8   Chance (Statistics & 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.
- ★ Use the language of 'if ....then, 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language.
- ★ **10A** Investigate reports of studies in digital media and elsewhere for information on their planning and implementation.

Chapter 9   Polynomials (Number & Algebra - Patterns & Algebra)
- ★ **10A** Investigate the concept of a polynomial and apply the factor and remainder theorems to solve problems.

Chapter 10   Review
- ★ All of above

Year 10   Term 3

Chapter 11   Finance (Number & Algebra - Money & Financial mathematics)
- ★ Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies.

Chapter 12   Trigonometry 1 (Measurement & Geometry - Pythagoras & Trigonometry)
- ★ Solve right-angled triangle problems including those involving direction and angles of elevation and depression.

Chapter 13   Statistics 1 (Statistics & Probability - Data Representation & Interpretation)
- ★ Determine quartiles and interquartile range.
- ★ Construct and interpret box plots and use them to compare data sets.
- ★ Compare shapes of box plots to corresponding histograms and dot plots.
- ★ **10A** Calculate and interpret the mean and standard deviation of data and use these to compare data sets.

Chapter 14   Graphs (Number & Algebra - Linear & Non-linear Relationships)
- ★ **10A** Apply understanding of polynomials to sketch a range of curves and describe the features of these curves from their equation.
- ★ **10A** Solve simple exponential equations.
- ★ **10A** Describe, interpret and sketch parabolas, hyperbolas, circles and exponential functions and their transformations.
- ★ **10A** Factorise monic and non-monic quadratic expressions and solve a wide range of quadratic equations derived from a variety of contexts.

Chapter 15   Review
- ★ All of above

Year 10   Term 4

Chapter 16   Coordinate Geometry (Number and Algebra - Non-linear Relationships)
- ★ Solve problems involving parallel and perpendicular lines.
- ★ Explore the connection between algebraic and graphical representations of relations such as simple quadratics and circles using digital technology as appropriate.

Chapter 17   Geometric Reasoning (Measurement & Geometry - Geometric Reasoning)
- ★ Formulate proofs involving congruent triangles and angle properties.
- ★ Apply logical reasoning, including the use of congruence and similarity, to proofs and numerical exercises involving plane shapes.
- ★ **10A** Prove and apply angle and chord properties of circles.

Chapter 18   Statistics 2 (Statistics & Probability - Data Representation & Interpretation)
- ★ Use scatter plots to investigate and comment on relationships between two numerical variables.
- ★ Investigate and describe bivariate numerical data where the independent variable is time.
- ★ Evaluate statistical reports in the media and other places by linking claims to displays, statistics and representative data.
- ★ **10A** Use information technologies to investigate bivariate numerical data sets. Where appropriate use a straight line to describe the relationship allowing for variation.

Chapter 19   Trigonometry 1 (Measurement & Geometry - Pythagoras & Trigonometry)
- ★ **10A** Establish the sine, cosine and area rules for any triangle and solve related problems.
- ★ **10A** Use the unit circle to define trigonometric functions, and graph them with and without the use of digital technologies.
- ★ **10A** Solve simple trigonometric equations.
- ★ **10A** Apply Pythagoras' theorem and trigonometry to solving three-dimensional problems in right-angled triangles.

Chapter 20   Review
- ★ All of above

4   CURRICULUM AUDIT

Year 7 Number and Algebra	Chapter
Number and place value	
• Investigate index notation and represent whole numbers as products of powers of prime numbers ACMNA149	11
• Investigate and use square roots of perfect square numbers ACMNA150	11
• Apply the associative, commutative and distributive laws to aid mental and written computation ACMNA151	7
• Compare, order, add and subtract integers ACMNA280	9
Real numbers	
• Compare fractions using equivalence. Locate and represent fractions and mixed numerals on a number line ACMNA152	6
• Solve problems involving addition and subtraction of fractions, including those with unrelated denominators ACMNA153	6 6
• Multiply and divide fractions and decimals using efficient written strategies and digital technologies ACMNA154	1
• Express one quantity as a fraction of another with and without the use of digital technologies ACMNA155	1
• Round decimals to a specified number of decimal places ACMNA156	1,16
• Connect fractions, decimals and percentages and carry out simple conversions ACMNA157	
• Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies ACMNA158	1,4,16
• Recognise and solve problems involving simple ratios ACMNA173	16
Money and financial mathematics	
• Investigate and calculate 'best buys', with and without digital technologies ACMNA174	4
Patterns and algebra	
• Introduce the concept of variables as a way of representing numbers using letters	7,12,17
• Create algebraic expressions and evaluate them by substituting a given value for each variab ACMNA175le	7,12,17
• Extend and apply the laws and properties of arithmetic to algebraic terms and expressions ACMNA177	7
Linear and non-linear relationships	
• Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point ACMNA178	9
• Solve simple linear equations ACMNA179	12,17
• Investigate, interpret and analyse graphs from authentic data ACMNA180	17

Year 7 Statistics and Probability	Chapter
Chance	
• Construct sample spaces for single-step experiments with equally likely outcomes ACMSP167	3
• Assign probabilities to the outcomes of events and determine probabilities for events ACMSP168	3
Data representation and interpretation	
• Identify and investigate issues involving continuous or large count data collected from primary and secondary sources ACMSP169	19
• Construct and compare a range of data displays including stem-and-leaf plots and dot plots ACMSP170	14,19
• Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data ACMSP171	14
• Describe and interpret data displays and the relationship between the median and mean ACMSP172	14,19

Year 7 Measurement and Geometry	Chapter
Using units of measurement	
• Establish the formulas for areas of rectangles, triangles and parallelograms and use these in problem solving ACMMG159	2,8
• Calculate volumes of rectangular prisms ACMMG160	8
Shape	
• Draw different views of prisms and solids formed from combinations of prisms ACMMG161	
Location and transformation	
• Describe translations, reflections in an axis, and rotations of multiples of 90° on the Cartesian plane using coordinates. Identify line and rotational symmetries ACMMG181	18
Geometric reasoning	
• Identify corresponding, alternate and cointerior angles when two parallel straight lines are crossed by a transversal ACMMG163	13
• Investigate conditions for two lines to be parallel and solve simple numerical problems using reasoning ACMMG164	13
• Classify triangles according to their side and angle properties and describe quadrilaterals ACMMG165	13
• Demonstrate that the angle sum of a triangle is 180° and use this to find the angle sum of a quadrilateral ACMMG166	13

Year 8 Number and Algebra	Chapter
Number and place value	
• Use index notation with numbers to establish the index laws with positive integral indices and the zero index ACMNA182	1
• Carry out the four operations with integers, using efficient mental and written strategies and appropriate digital technologies ACMNA183	2
Real numbers	
• Investigate terminating and recurring decimals ACMNA184	6
• Investigate the concept of irrational numbers, including π ACMNA186	6
• Solve problems involving the use of percentages, including percentage increases and decreases, with and without digital technologies ACMNA187	11
• Solve a range of problems involving rates and ratios, with and without digital technologies ACMNA188	11
Money and financial mathematics	
• Solve problems involving profit and loss, with and without digital technologies ACMNA189	11
Patterns and algebra	
• Extend and apply the distributive law to the expansion of algebraic expressions ACMNA190	3
• Factorise algebraic expressions by identifying numerical factors ACMNA191	3
• Simplify algebraic expressions involving the four operations ACMNA192	3
Linear and non-linear relationships	
• Plot linear relationships on the Cartesian plane with and without the use of digital technologies ACMNA193	16
• Solve linear equations using algebraic and graphical techniques. Verify solutions by substitution ACMNA194	12,16

Year 8 Measurement and Geometry	Chapter
Using units of measurement	
• Choose appropriate units of measurement for area and volume and convert from one unit to another ACMMG195	9,17
• Find perimeters and areas of parallelograms, rhombuses and kites ACMMG196	17
• Investigate the relationship between features of circles such as circumference, area, radius and diameter. Use formulas to solve problems involving circumference and area ACMMG197	9
• Develop the formulas for volumes of rectangular and triangular prisms and prisms in general. Use formulas to solve problems involving volume ACMMG198	17
• Solve problems involving duration, including using 12- and 24-hour time within a single time zone ACMMG199	14
Geometric reasoning	
• Define congruence of plane shapes using transformations ACMMG200	7
• Develop the conditions for congruence of triangles ACMMG201	7,19
• Establish properties of quadrilaterals using congruent triangles and angle properties, and solve related numerical problems using reasoning ACMMG202	19

Year 8 Statistics and Probability	Chapter
Chance	
• Identify complementary events and use the sum of probabilities to solve problems ACMSP204	4,18
• Describe events using language of 'at least', exclusive 'or' (A or B but not both), inclusive 'or' (A or B or both) and 'and'. ACMSP205	18
• Represent such events in two-way tables and Venn diagrams and solve related problems ACMSP292	18
Data representation and interpretation	
• Investigate techniques for collecting data, including census, sampling and observation ACMSP284	8,13
• Explore the practicalities and implications of obtaining representative data using a variety of investigative processes ACMSP206	8,13
• Explore the variation of means and proportions of random samples drawn from the same population ACMSP293	13
• Investigate the effect of individual data values , including outliers, on the mean and median ACMSP207	8,13

Year 9 Number and Algebra	Chapter
Real numbers	
• Solve problems involving direct proportion. Explore the relationship between graphs and equations corresponding to simple rate problems ACMNA208	6 6
• Apply index laws to numerical expressions with integer indices ACMNA209	1,11
• Express numbers in scientific notation ACMNA210	11
Money and financial mathematics	
• Solve problems involving simple interest ACMNA211	
Patterns and algebra	
• Extend and apply the index laws to variables, using positive integral indices and the zero index ACMNA212	2,18
• Apply the distributive law to the expansion of algebraic expressions, including binomials, and collect like terms where appropriate ACMNA213	2,18
Linear and non-linear relationships	
• Find the distance between two points located on a Cartesian plane using a range of strategies, including graphing software ACMNA214	16
• Find the midpoint and gradient of a line segment (interval) on the Cartesian plane using a range of strategies, including graphing software ACMNA294	16
• Sketch linear graphs using the coordinates of two points ACMNA215	4
• Sketch simple non-linear relations with and without the use of digital technologies ACMNA296	4

Year 9 Measurement and Geometry	Chapter
Using units of measurement	
• Calculate the areas of composite shapes ACMMG216	3
• Calculate the surface area and volume of cylinders and solve related problems ACMMG217	3
• Solve problems involving the surface area and volume of right prisms ACMMG218	3,13
• Investigate very small and very large time scales and intervals ACMMG219	11
Geometric reasoning	
Use the enlargement transformation to explain similarity and develop the conditions for triangles to be similar ACMMG220	8
Solve problems using ratio and scale factors in similar figures ACMMG221	8
Pythagoras and trigonometry	
• Investigate Pythagoras' Theorem and its application to solving simple problems involving right angled triangles ACMMG222	7,12
• Use similarity to investigate the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles ACMMG223	12,17
• Apply trigonometry to solve right-angled triangle problems ACMMG224	12,17

Year 9 Statistics and Probability	Chapter
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	14,19
• Calculate relative frequencies from given or collected data to estimate probabilities of events involving 'and' or 'or' ACMSP226	14,19
• Investigate reports of surveys in digital media and elsewhere for information on how data were obtained to estimate population means and medians ACMSP227	19
Data representation and interpretation	
• Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collect data directly from secondary sources ACMSP228	9
• Construct back-to-back stem-and-leaf plots and histograms and describe data, using terms including 'skewed', 'symmetric' and 'bi modal' ACMSP282	9
• Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread ACMSP283	9

Year 10 Number and Algebra	Chapter
Money and financial mathematics	
• Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies	11
Real numbers	
• **10A** Define rational and irrational numbers and perform operations with surds and fractional indices	4
• **10A** Use the definition of a logarithm to establish and apply the laws of logarithms	4
Patterns and algebra	
• Factorise algebraic expressions by taking out a common algebraic factor	1,6,9
• Simplify algebraic products and quotients using index laws	6,9
• Apply the four operations to simple algebraic fractions with numerical denominators	1,6,9
• Expand binomial products and factorise monic quadratic expressions using a variety of strategies	1,6,9
• Substitute values into formulas to determine an unknown	1,6,9
• **10A** Investigate the concept of a polynomial and apply the factor and remainder theorems to solve problems	6,9
Linear and non-linear relationships	
• Solve problems involving linear equations, including those derived from formulas	2
• Solve linear inequalities and graph their solutions on a number line	2
• Solve linear simultaneous equations, using algebraic and graphical techniques including using digital technology	2
• Solve problems involving parallel and perpendicular lines	16
• Explore the connection between algebraic and graphical representations of relations such as simple quadratics, circles and exponentials using digital technology as appropriate	6
• Solve linear equations involving simple algebraic fractions	7
• Solve simple quadratic equations using a range of strategies	7,14
• **10A** Describe, interpret and sketch parabolas, hyperbolas, circles and exponential functions and their transformations	14
• **10A** Solve simple exponential equations	14
• **10A** Apply understanding of polynomials to sketch a range of curves and describe the features of these curves from their equation	14
• **10A** Factorise monic and non-monic quadratic expressions and solve a wide range of quadratic equations derived from a variety of contexts	14

Year 10 Measurement and Geometry	Chapter
Using units of measurement	
• Solve problems involving surface area and volume for a range of prisms, cylinders and composite solids	3
• **10A** Solve problems involving surface area and volume of right pyramids, right cones, spheres and related composite solids	3
Geometric reasoning	
• Formulate proofs involving congruent triangles and angle properties	17
• Apply logical reasoning, including the use of congruence and similarity, to proofs and numerical exercises involving plane shapes	17
• **10A** Prove and apply angle and chord properties of circles	17
Pythagoras and trigonometry	
• Solve right-angled triangle problems including those involving direction and angles of elevation and depression	12,19
• **10A** Establish the sine, cosine and area rules for any triangle and solve related problems	19
• **10A** Use the unit circle to define trigonometric functions, and graph them with and without the use of digital technologies	19
• **10A** Solve simple trigonometric equations	19
• **10A** Apply Pythagoras' theorem and trigonometry to solving three-dimensional problems in right-angled triangles	19

Year 10 Statistics and Probability	Chapter
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	8
• Use the language of 'if ....then, 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language	8
• **10A** Investigate reports of studies in digital media and elsewhere for information on the planning and implementation of such studies, and the reporting of variability	8
Data representation and interpretation	
• Determine quartiles and interquartile range	13
• Construct and interpret box plots and use them to compare data sets	13
• Compare shapes of box plots to corresponding histograms and dot plots	13
• Use scatter plots to investigate and comment on relationships between two continuous variables	18
• Investigate and describe bivariate numerical data where the independent variable is time	18
• Evaluate statistical reports in the media and other places by linking claims to displays, statistics and representative data	18
• **10A** Calculate and interpret the mean and standard deviation of data and use these to compare data sets	13
• **10A** Use information technologies to investigate bivariate numerical data sets. Where appropriate use a straight line to describe the relationship allowing for variation	18

5   ASSESSMENT PLAN

Teachers use the achievement standards, at the end of a period of teaching, to make on-balance judgments about the quality of learning demonstrated by the students – that is whether they have achieved below, at, or above the standard. To make these judgments, teachers draw on assessment data that they have collected as evidence during the course of the teaching period. These judgments about the quality of learning are one source of feedback to students and their parents and inform formal reporting processes (ACARA, 2011).

Assessment takes place in different levels and for different purposes, including (ACARA, 2011):
★ ongoing formative assessment within classrooms for the purposes of monitoring learning and providing feedback, to teachers to inform their teaching, and for students to inform their learning
★ summative assessment for the purposes of twice-yearly reporting by schools to parents and carers on the progress and achievement of students
★ annual testing of Years 3, 5, 7 and 9 students' levels of achievement in aspects of literacy and numeracy, conducted as part of the National Assessment Program – Literacy and Numeracy (NAPLAN)
★ periodic sample testing of specific learning areas within the Australian Curriculum as part of the National Assessment Program (NAP).

Summative assessment per term

Task	Teacher assistance	Class time	Open book	Time	Group/ individual
Term tests	No	100%	No	40 mins	Individual
Mental computation	No	100%	No	10 mins	Individual
Rich tasks	Yes	80%	Yes	1 week	Group