Australian
CURRICULUM
Review

MATHEMATICS

CONSULTATION CURRICULUM

Scope and sequence 7–10

Mathematics	Year 7	Year 8
	Achievement standard	
	By the end of Year 7, students use all four operations in calculations involving positive fractions and decimals, using the properties of number systems and choosing the computational approach. They represent natural numbers in expanded form and as products of prime factors, using exponent notation. Students model and solve problems involving addition and subtraction of integers. They determine equivalent representations of rational numbers and choose from fraction, decimal and percentage forms to assist in computations. They solve problems involving rational numbers, percentages and ratios and explain their choice of representation of rational numbers and results when they model situations, including those in financial contexts. They use algebraic expressions to model situations and represent formulas. Students substitute values into these formulas to determine unknown values and interpret these in the context. They use computational thinking and digital tools to generate tables of values related to algebraic expressions including formulas, evaluating the effect of variation. Students apply knowledge of angle relationships involving parallel lines and a transversal, and the sum of angles in a triangle to solve problems, giving reasons. They develop, explain and apply measurement formulas involving the areas of triangles and parallelograms and the volumes of rectangular and triangular prisms to solve practical problems Students describe the relationships between the radius, diameter and circumference of a circle. They classify polygons and other shapes according to their features and represent objects two-dimensionally in different ways reasoning about these representations. Students use coordinates to describe transformations of points in the plane. They plan and conduct statistical investigations involving numerical data, use appropriate displays to represent the distribution and interpret this data in terms of summary statistics, with informal consideration of possible outliers. Students decide which central measure (mean, median or mode) is most suitable and explain their reasoning. They list sample spaces for single step experiments, assign probabilities to outcomes, determine probabilities for related events and compare these to results obtained empirically, giving reasons for differences between expected and observed results.	By the end of Year 8, students recognise the relationship between fractions and their terminating or recurring decimal expansion. They apply the exponent laws to calculations with numbers involving non-negative exponents. Students solve problems involving the four operations with integers and positive rational numbers, using mental, written and digital tools as appropriate. They apply proportional reasoning to solve practical problems involving ratios, percentage change, proportions of quantities and rates in measurement and financial contexts. Students apply algebraic properties to rearrange, expand and factorise linear expressions. They apply linear relations to model situations, representing these with tables, graphs and algebraically, and solve related equations interpreting them in context. Students apply computational thinking with digital tools to make and investigate conjectures involving rational numbers. They choose and use suitable metric units when solving measurement problems involving the perimeter and area of composite shapes, and volume and capacity of prisms. Students use Pythagoras' theorem to solve simple measurement problems involving unknown lengths and apply formulas to solve problems involving area and circumference of circles. They solve problems of duration involving 12-hour and 24-hour cycles across multiple time zones. Students use three dimensions to locate and describe position in three-dimensional contexts. They apply computational thinking to evaluate algorithms designed to test for congruency and similarity of shapes and use these conditions to transform shapes in the plane and solve related problems. Students conduct statistical investigations recognising the implications of obtaining data through sampling. They analyse and report on primary and secondary data from a range of contexts. Students compare the distributions of random samples of the same size from a given population with respect to variation, measures of central tendency and range, with consideration of the effects of outliers. They represent the possible combinations of two events with tables and diagrams and determine related probabilities to solve practical problems. Students design and conduct experiments and simulations to explore and identify complementary and mutually exclusive events and calculate related probabilities.
Strand	**Content description**	
	Students learn to:	
Number	investigate and use square roots of perfect square numbers (AC9M7N01)	recognise and investigate irrational numbers in applied contexts including certain square roots and π (AC9M8N01)
	investigate exponent notation and represent natural numbers as products of powers of prime numbers (AC9M7N02)	use exponent notation with numbers to establish the exponent laws with positive integral exponents and the zero exponent (AC9M8N02)
	use place value and powers of 10 to represent natural numbers in expanded notation (AC9M7N03)	
	round decimals correct to a given accuracy with respect to the context and the purpose of the calculation. Use appropriate rounding and estimation to make decisions about the reasonableness of solutions (AC9M7N04)	recognise and investigate terminating and recurring decimals (AC9M8N03)
	determine equivalent fraction, decimal and percentage representations of rational numbers. Locate and represent positive and negative fractions, decimals and mixed numbers on a number line (AC9M7N05)	
	carry out the four operations with fractions and decimals and solve problems involving rational numbers and percentages, choosing representations that are suited to the context and enable efficient computational strategies (AC9M7N06)	use the four operations with integers and rational numbers to model and solve problems (including financial contexts), using efficient mental and written strategies and appropriate digital tools (AC9M8N04)
	compare, order, add and subtract integers. Model and solve problems (including financial contexts)	

Algebra	involving addition and subtraction of integers (AC9M7N07)	
	model situations (including financial contexts) and solve problems using rational numbers and percentages and digital tools as appropriate. Interpret results in terms of the situation (AC9M7N08)	model situations (including financial contexts) and solve problems using percentage increases and decreases, using digital tools as appropriate. Interpret the results in terms of the situation (AC9M8N05)
	explore the use of variables in everyday formulas and substitute values into formulas to determine an unknown, in practical contexts (AC9M7A01)	
	create algebraic expressions using constants, variables, operations and brackets. Interpret and factorise these expressions, applying the associative, commutative, identity and distributive laws as applicable (AC9M7A02)	extend and apply the associative, commutative, identity, distributive and inverse properties to create, expand, factorise, rearrange and simplify linear expressions. Use the simplified expressions to solve for given variables (AC9M8A01)
	interpret, discuss and analyse relationships represented in graphs from authentic data (AC9M7A03)	graph linear relations on the Cartesian plane and solve linear equations and one-variable inequalities using algebraic and graphical techniques including the use of graphing software. Verify solutions by substitution (AC9M8A02)
	generate a table of values using the rule of a simple function. Develop tables to represent and describe relationships and plot these relationships on the Cartesian plane (AC9M7A04)	use linear functions to model and interpret situations. Represent these using tables, graphs on the Cartesian plane and algebra to interpolate, extrapolate and solve equations. Interpret solutions in the modelling context (AC9M8A03)
	apply computational thinking and digital tools to construct tables of values from formulas involving several variables, and systematically explore the effect of variation in one variable while assigning fixed values for other variables (AC9M7A05)	apply computational thinking and reasoning to make and evaluate conjectures that generalise patterns involving rational numbers, using algorithms and digital tools (AC9M8A04)
Measurement	establish the formulas for areas of triangles and parallelograms, using their relationship to rectangles and use these to solve practical problems using appropriate units (AC9M7M01)	solve problems involving the area and perimeter of composite shapes including the combinations of regular and irregular shapes in practical contexts using appropriate units (AC9M8M01)
	establish the formula for the volume of a prism. Use formulas and appropriate units to solve problems involving the volume of prisms including rectangular and triangular prisms (AC9M7M02)	choose and justify the appropriate metric units for solving problems involving perimeter, area, volume and capacity. Solve practical problems involving the volume and capacity of prisms and converting from one metric unit to another (AC9M8M02)
	investigate the relationship between the ratio π and features of circles such as the circumference, radius and diameter (AC9M7M03)	establish the formula for the area of a circle and use formulas to solve problems involving circumference and area of a circle (AC9M8M03)
	explore the use of ratios to compare quantities. Model situations (including investigating 'best buys') using ratios and solve practical problems, interpreting results in terms of the situation (AC9M7M04)	model situations and solve problems using ratios including ratios with more than two terms and ratios involving rational numbers maintaining the proportional relationships in the context of the problem, using digital tools as appropriate, and interpret the results in terms of the situation (AC9M8M04)
		model situations (including financial contexts) using proportional thinking to indirectly measure quantities and solve problems involving rates, interpreting the results in terms of the situation (AC9M8M05)
		solve problems involving duration, including using 12-hour and 24-hour time across multiple time zones (AC9M8M06)
	establish relationships between angles formed when parallel lines are crossed by a transversal including a perpendicular line. Apply knowledge of vertically opposite, complementary, supplementary, corresponding, alternate and co-interior angles to solve problems and explain reasoning.(AC9M7M05)	
	demonstrate that the angle sum of a triangle in the plane is 180°. Use this to determine the angle sum of other two-dimensional shapes and to indirectly determine the size of unknown angles in practical contexts (AC9M7M06)	investigate Pythagoras' theorem and its application to solving problems involving right-angled triangles (AC9M8M07)
Space	explore different ways of representing objects in two-dimensions. Discuss and reason about the advantages and disadvantages of each representation (AC9M7SP01)	explore different ways of representing and describing the position and location in three-dimensions including using a three-dimensional coordinate system with the use of dynamic geometric software and other technologies (AC9M8SP01)
	classify triangles, quadrilaterals and other shapes according to their side and angle properties, identify and reason about relationships (AC9M7SP02)	establish properties of quadrilaterals using congruent triangles and angle properties and solve related numerical problems using reasoning (AC9M8SP02)
	use coordinates to describe transformations in the Cartesian plane of a set of points using translations, reflections on an axis, and rotations of multiples of right angles (AC9M7SP03)	establish and explain the conditions for sets of common shapes to be congruent or similar and relate these to transformations of the plane giving reasons (AC9M8SP03)
	apply computational thinking to design and create an algorithm that will sort and classify shapes (AC9M7SP04)	apply computational thinking to evaluate and refine algorithms designed to identify similar or congruent shapes (AC9M8SP04)

Australian Curriculum: Mathematics – Scope and sequence 7–10
Consultation curriculum

Statistics	construct a range of stem-and-leaf and dot plots with appropriate intervals and partition these plots to interpret and compare the distributions including determining the range, median, mean and mode (AC9M7ST01)	investigate techniques for data collection including census, sampling and observation and discuss the practicalities and implications of obtaining data through these techniques (AC9M8ST01)
	make and justify decisions of which measure(s) of central tendency provide(s) useful insights into the nature of the distribution of data in a given context (AC9M7ST02)	analyse and report on the distribution of data from primary and secondary sources using various sampling techniques to select and study samples (AC9M8ST02)
	create different types of displays or visualisations using software where appropriate. Describe and compare the distribution of data commenting on the spread (including outliers) and determine the range, median, mean and mode (AC9M7ST03)	compare different random samples of the same size drawn from the same population with respect to variations in proportions, means, medians and range and explore the effect of possible outliers on these measures (AC9M8ST03)
	plan and conduct statistical investigations that produce numerical data sets. Represent the data using appropriate displays. Analyse and interpret data distributions reporting results in terms of summary statistics (AC9M7ST04)	plan and conduct statistical investigations based on the relationship between samples and a population and consideration of the context. Use ethical, fair, and efficient methods for gathering relevant data (AC9M8ST04)
Probability	list the sample space for single-step events. Assign probabilities to the outcomes of these events and determine probabilities for related events (AC9M7P01)	recognise that complementary events have a combined probability of 1 and that for a single event A, $Pr(A) + Pr(notA) = 1$. Use these relationships to calculate probabilities related to practical problems (AC9M8P01)
		determine all possible combinations for two events A and B and use the relation Pr(A and B) + Pr(A and not B) + Pr(not A and B) + Pr(not A and not B) = 1 with two-way tables and Venn diagrams and apply to practical probability problems (AC9M8P02)
	use probability to predict the expected number of favourable outcomes for an event. Compare this with simulated results of an increasingly large number of trials explaining the differences between observed and expected results (AC9M7P02)	use observations and design and conduct experiments and simulations to explore and identify complementary and mutually exclusive events (AC9M8P03)

Mathematics	Year 9	Year 10
	Achievement standard	
	By the end of Year 9, students use real numbers to solve problems. They extend and apply the exponent laws with positive integers to variables when factorising expressions. Students model situations involving change and solve linear and quadratic equations numerically, graphically and algebraically using inverse operations and by expanding and factorising algebraic expressions, using digital tools as appropriate. They describe the effects of variation of parameters on functions and relations and their graphical and algebraic representations, using computational thinking to generalise connections between them. Students apply formulas to solve practical problems involving the surface area and volume of right prisms and cylinders. They solve practical problems involving ratio, similarity and scale in two-dimensional situations. Students apply Pythagoras' theorem and use trigonometric ratios to solve practical problems involving right angled triangles. They model situations and solve problems involving finance, measurement and direct proportion interpreting solutions in context. Students express small and large numbers in scientific notation and use this form in measurement contexts. They determine errors in measurements and interpret their effect on results. Students apply the enlargement transformation to images of shapes and objects and identify and describe attributes that change or are invariant. They apply Euler's formula to solve problems relating to planar graphs and polyhedrons. Students create and use algorithms to test spatial conjectures. They compare and analyse the distributions of multiple univariate data sets, choosing representations with respect to the questions under investigation and describe features of these including consideration of summary statistics, symmetry and skew. Students obtain data from primary and secondary sources and explain how sampling techniques and representation can be used to support or question conclusions or to promote a point of view. They determine sets of outcomes for compound events and represent these in various ways and assign probabilities to these events. Students design and conduct experiments or simulations to gather empirical data.	By the end of Year 10, students model situations and apply computational approaches to solving problems. They use digital tools to obtain and investigate and discuss the effect of approximations of exact irrational real numbers in combined and repeated calculations. Students use algebraic techniques to model phenomena, including financial applications, growth and decay and applying linear, quadratic and exponential functions as appropriate. They solve related algebraic equations, numerically, graphically and using computational thinking and digital tools. Students solve problems involving parallel and perpendicular lines. They formulate, solve, and interpret solutions to problems involving linear inequalities and simultaneous linear equations in two variables graphically. Students use and interpret logarithmic scales representing small or large quantities or change in applied contexts. They solve practical measurement problems involving surface area and volumes of objects and composite solids. Students apply Pythagoras' theorem and trigonometry to solve spatial problems involving right angled triangles. They consider levels of accuracy and sources of error in measurement with instruments, and the possible impact of these when applying measurement formulas. Students describe and apply geometric theorems to solve problems, giving reason for solutions. They use networks to model relationships, interpret situations and describe connectedness. Students design and conduct statistical investigations involving bivariate numerical data. They represent the distribution of data involving two variables using tables and scatter plots and discuss possible association. Students consider association between numerical variables including trend data when time is one of the variables. They critically analyse media in terms of the claims and conclusions, noting limitations and potential sources of bias. Students represent and compare the distribution of data for a continuous variable using various displays and discuss distributions in terms of summary statistics and their features. They apply conditional probability and independence to solve problems involving compound events, using diagrams. Students use computational thinking and reasoning to solve spatial problems and design and conduct simulations modelling phenomena involving compound events including conditional probability.

Australian Curriculum: Mathematics – Scope and sequence 7–10
Consultation curriculum

Strand	Content description *Students learn to*	
Number	recognise that the real number system includes all rational and irrational numbers and use real numbers to solve problems using digital tools as appropriate (AC9M9N01)	recognise through experimentation and the use of technology, the effect of using approximations of real numbers in repeated calculations and compare the results when using exact representations (AC9M10N01)
Algebra	apply the exponent laws to numerical expressions with integer exponents and extend to variables, using positive integer exponents (AC9M9A01)	use formulas involving exponents and real numbers to model practical problems (including financial contexts) involving growth and decay and solve using digital tools as appropriate (AC9M10A01)
	expand and factorise algebraic expressions including simple quadratic expressions (AC9M9A02)	expand and factorise expressions and apply exponent laws involving products, quotients and powers of variables. Apply to solve equations algebraically (AC9M10A02)
	determine the gradient of a line segment passing through two given points on the Cartesian plane and the distance and midpoint between these points using a range of strategies, including graphing software and apply to spatial problems (AC9M9A03)	solve problems involving parallel and perpendicular lines obtained from the graphs of linear functions (AC9M10A03)
		use linear inequalities to model situations, representing them graphically and interpret in the context of the situation. Verify solutions to other inequalities by substitution (AC9M10A04)
	graph simple non-linear relations using graphing software where appropriate and solve linear and quadratic equations involving a single variable graphically, numerically and algebraically using inverse operations and digital tools as appropriate (AC9M9A04)	recognise the connection between algebraic and graphical representations of exponential relations and solve simple related exponential equations using digital tools as appropriate (AC9M10A05)
	use linear and simple quadratic functions to model a variety of different situations involving change and represent these using tables, graphs on the Cartesian plane and algebra. Interpolate, extrapolate and solve equations, interpreting solutions in the modelling context (AC9M9A05)	model situations (including financial contexts) with simultaneous equations in two variables. Solve pairs of these equations and interpret solutions graphically in the modelling context (AC9M10A06)
	apply computational thinking to investigate the effects of the variation of parameters on families of graphs of functions and relations using digital tools. Generalise emerging patterns and apply models to situations or problems (AC9M9A06)	apply computational thinking to model and solve algebraic problems graphically or numerically (AC9M10A07)
Measurement	solve problems involving the volume of right prisms and cylinders in practical contexts and explore their relationship to right pyramids and cones (AC9M9M01)	solve problems involving the surface area and volume of composite objects including estimating the volume of irregular objects in practical contexts (AC9M10M01)
	solve problems involving the surface area of right prisms and cylinders (AC9M9M02)	
	express number in scientific notation and solve problems involving very small and very large measurements, time scales and intervals using scientific notation and appropriate units (AC9M9M03)	interpret and use logarithmic scales to model phenomena involving small and large quantities and change (AC9M10M02)
	model situations involving scale and ratio in two-dimensions and solve related practical problems (AC9M9M04)	model situations involving scale, ratios and rates relating to objects in two and three-dimensions and solve related practical problems (AC9M10M03)
	explore the relationship between graphs and equations corresponding to rate problems and solve problems involving direct proportion (AC9M9M05)	
	recognise that all measurements are estimates and calculate and interpret absolute, relative and percentage errors in measurements (AC9M9M06)	identify levels of accuracy and the sources of measurement errors in practical contexts and investigate the impact of measurement errors on results (AC9M10M04)
	apply angle properties, scale, similarity, Pythagoras' theorem and trigonometry in right angled triangles to solve practical problems (AC9M9M07)	apply trigonometry of right angles triangles and Pythagoras' theorem to model and solve practical problems in two and three-dimensions including those involving direction and angles of elevation and depression (AC9M10M05)
Space	recognise Euler's formula can be applied to different types of problems including problems relating to planar graphs, platonic solids and other polyhedra (AC9M9SP01)	model practical situations as a network and use network diagrams to specify relationships and connectedness (AC9M10SP01)
	recognise the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles using similarity (AC9M9SP02)	apply logical reasoning (including the use of congruence and similarity) to proofs involving shapes in the plane and apply theorems to solve spatial problems (AC9M10SP02)

Australian Curriculum: Mathematics – Scope and sequence 7–10
Consultation curriculum

	apply the enlargement transformation to shapes and objects using dynamic geometric software as appropriate. Identify and explain aspects that remain the same and those that change (AC9M9SP03)	
	apply computational thinking to construct, evaluate and refine algorithms designed to test spatial conjectures (AC9M9SP04)	apply computational thinking to solving spatial problems (AC9M10SP03)
Statistics	investigate reports of surveys in digital media and elsewhere for information on how data was obtained to estimate population means and medians. Explain how different sampling methods can affect the results of surveys and how choice of representation could be employed to support a particular point of view (AC9M9ST01)	evaluate statistical reports in the media in terms of questions posed, data gathering and representation of distributions. Analyse claims and inferences, including ethical considerations and identification of potential sources of bias (AC9M10ST01)
	represent the distribution of multiple numerical data sets using comparative representations (including back-to-back stem-and-leaf plots and grouped histograms). Compare data with consideration of centre, spread and shape (AC9M9ST02)	compare data distributions for continuous numerical variables using appropriate data displays (including boxplots). Discuss the shapes of these distributions in terms of centre, spread, shape and outliers in the context of the data (AC9M10ST02)
	choose appropriate forms of display or visualisation for a given type of data, justify selections and interpret displays with respect to statistical questions of interest for a given context (AC9M9ST03)	create and use scatterplots to investigate and comment on the relationships between two numerical variables. Describe the relationship and discuss any conclusions that may be drawn (AC9M10ST03)
		recognise and explore associations between categorical variables using two-way (contingency) tables and identify and discuss possible relationships (AC9M10ST04)
	plan, conduct and review statistical investigations involving comparative analysis of multiple univariate data sets collected directly or from secondary sources (AC9M9ST04)	plan, conduct and review statistical investigations of association and trend in bivariate numerical data. Discuss association in terms of strength, direction and linearity (AC9M10ST05)
Probability	list all outcomes for two-step chance events both with and without replacement using tree diagrams or arrays. Assign probabilities to outcomes and determine probabilities for events (AC9M9P01)	use the language of 'if .... then, 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language (AC9M10P01)
	investigate and determine the probabilities of compound events using proportional reasoning and relate to the use of the language 'and', inclusive 'or', and exclusive 'or' (AC9M9P02)	use probability, random variables and simulations to model phenomena, including sampling with and without replacement, and evaluate results (AC9M10P02)
	design and conduct experiments or simulations that demonstrate the relationship between combined conditions for events and the probability of individual events (AC9M9P03)	design and use probability simulations to model and investigate situations including problems involving compound events and simulations that use conditional statements to produce different outcomes. Apply reasoning to evaluate and report on their effectiveness (AC9M10P03)