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Curriculum intent	Year level description	<p>The proficiency strands <i>Understanding, Fluency, Problem Solving and Reasoning</i> 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.</p> <p>At this year level:</p> <p>Understanding includes describing patterns involving indices and recurring decimals, identifying commonalities between operations with algebra and arithmetic, connecting rules for linear relations their graphs, explaining the purpose of statistical measures, and explaining measurements of perimeter and area</p> <p>Fluency includes calculating accurately with simple decimals, indices and integers, recognising equivalence of common decimals and fractions including recurring decimals, factorising and simplifying basic algebraic expressions, and evaluating perimeters, areas of common shapes and their volumes and three dimensional objects</p> <p>Problem Solving includes formulating, and modelling practical situations involving ratios, profit and loss, areas and perimeters of common shapes, and using two-way tables and Venn diagrams to calculate probabilities</p> <p>Reasoning includes justifying the result of a calculation or estimation as reasonable, deriving probability from its complement, using congruence to deduce properties of triangles, finding estimates of means and proportions of populations</p>
	Achievement standard	<p>By the end of Year 8, students solve everyday problems involving rates, ratios and percentages. They describe index laws and apply them to whole numbers. They describe rational and irrational numbers. Students solve problems involving profit and loss. They make connections between expanding and factorising algebraic expressions. Students solve problems relating to the volume of prisms. They make sense of time duration in real applications. They identify conditions for the congruence of triangles and deduce the properties of quadrilaterals. Students model authentic situations with two-way tables and Venn diagrams. They choose appropriate language to describe events and experiments. They explain issues related to the collection of data and the effect of outliers on means and medians in that data.</p> <p>Students use efficient mental and written strategies to carry out the four operations with integers. They simplify a variety of algebraic expressions. They solve linear equations and graph linear relationships on the Cartesian plane. Students convert between units of measurement for area and volume. They perform calculations to determine perimeter and area of parallelograms, rhombuses and kites. They name the features of circles and calculate the areas and circumferences of circles. Students determine the probabilities of complementary events and calculate the sum of probabilities.</p>

Unit Overview		SEMESTER 1		SEMESTER 2	
Sequencing teaching and learning		Unit 1	Unit 2	Unit 3	Unit 4
		<p>Students have opportunities to develop understandings of:</p> <ul style="list-style-type: none"> Number and place value - apply the four operations to rational numbers and integers and solve problems. Real numbers - make connections between percentages, fractions and decimals, calculate a percentage of a quantity, percentage increase and decrease, discount, profit, loss and GST, and problem solve in a range of contexts including financial situations, identify terminating and recurring decimals, link fractions to terminating and recurring decimals and explore irrational numbers in relation to pi. Chance - describe and calculate the probability of 'and', 'or', and 'not' events, represent events in Venn diagrams and two-way tables and solve related problems, identify complementary events and use the sum of probabilities to solve problems. 	<p>Students have opportunities to develop understandings of:</p> <ul style="list-style-type: none"> Number and place value - express numbers in index notation, establish the index laws with whole number bases and positive integral indices Patterns and algebra - expand and factorise algebraic expressions. Using units of measurement - convert units of measure, revise perimeter and area of parallelograms and triangles, develop formulas for rhombuses, kites, trapeziums and circles, calculate the perimeter and area of rhombuses, kites, trapeziums and circles, problem solve and reason involving perimeter, circumference and area. 	<p>Students have opportunities to develop understandings of:</p> <ul style="list-style-type: none"> Linear and non-linear relationships - model situations involving proportional relationships, solve a range of problems involving rates and ratios, interpret, model and formulate patterns and relationships, represent patterns and relationships as rules, functions, tables and graphs and solve linear equations using graphical techniques. Using units of measurement - solve problems involving time duration, for 12- and 24- time formats, within a single time zone. Data representation and interpretation - collect, organise and display data, interpret data displayed in tables and graphs, connect samples and populations, explore the effect of sample size, calculate measures of centre, identify outliers and their effect on measures of centre, identify sources of bias and apply this knowledge to make hypotheses and support conclusions. 	<p>Students have opportunities to develop understandings of:</p> <ul style="list-style-type: none"> Linear and non-linear relationships - apply number laws to algebraic expressions and equations, expand and factorise algebraic expressions, solve simple linear equations algebraically and graphically, connect patterns, linear functions, tables of values, graphs and worded statements, plot coordinates on the Cartesian plane and solve realistic problems. Using units of measurement - develop formulas for volume and capacity of rectangular and triangular prisms, solve volume problems involving rectangular and triangular prisms and convert units of measurement. Geometric reasoning - revise angle properties (co-interior, corresponding, alternate and vertically opposite), explore congruence, establish and apply the congruence tests (SAS, AAS, SSS, RHS), extend congruence of triangles to identify the properties of quadrilaterals and solve problems using the properties of congruent figures, reasoning and generalisations, apply understanding and reasoning of area, congruence and plane shapes to develop properties of quadrilaterals.
	General capabilities and cross-curriculum priorities	<p>Opportunities to engage with:</p> 	<p>Opportunities to engage with:</p> 	<p>Opportunities to engage with:</p> 	<p>Opportunities to engage with:</p> 

	Key	<p><i>General capabilities</i></p> <ul style="list-style-type: none">  Literacy  Numeracy  Information and Communication Technology (ICT) Capability 	<ul style="list-style-type: none">  Personal and Social Capability  Ethical Understanding  Intercultural Understanding  Critical and Creative thinking 	<p><i>Cross-curriculum priorities</i></p> <ul style="list-style-type: none">  Aboriginal and Torres Strait Islander Histories and Cultures  Asia and Australia's Engagement with Asia  Sustainability
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Assessment	Assessment	Student responses to summative assessment tasks contribute to their assessment folio. It provides evidence of their learning and represents their achievements over reporting period. The assessment folio should include a range and balance of assessments to make valid judgments about whether the student has met the achievement standard.			
		Semester 1		Semester 2	
		Unit 1: Solving problems involving percentages and profit and loss <i>Short answer questions</i> Students use percentage to calculate commission, mark-up, profit and loss and make financial decisions.	Unit 2: Applying index, algebra and measurement concepts <i>Short answer questions</i> Students connect and apply mathematical concepts involving indices, algebra and measurement.	Unit 3: Investigating relationships between game variables <i>Assignment/Project</i> Students collect representative data and interpret the results to find relationships between different game variables.	Unit 4: Applying algebra, geometry and measurement understanding <i>Short answer questions</i> Students solve volume of prism problems, identify and apply congruence of triangles and apply algebraic understanding
		Unit 1: Investigating the probability of events <i>Assignment/Project</i> Students use probability to make and justify informed conclusions.		Unit 3: Applying ratios, linear relationships and time concepts <i>Short answer questions</i> Students solve everyday problems involving rates, ratios, time durations and linear relationships.	
Moderation	Consistency of teacher judgments	Teachers use moderation to support consistency of teacher judgments and comparability of reported results against the relevant achievement standards.			

Content descriptions for Year 8 Mathematics

Review for balance and coverage of content descriptions

Number and Algebra	Semester 1		Semester 2	
	Unit 1	Unit 2	Unit 3	Unit 4
Number and place value				
Use index notation with numbers to establish the index laws with positive integral indices and the zero index. [ACMNA182]		✓		
Carry out the four operations with rational numbers and integers, using efficient mental and written strategies and appropriate digital technologies. [ACMNA183]	✓		✓	
Real numbers				
Investigate terminating and recurring decimals. [ACMNA184]	✓			
Investigate the concept of irrational numbers, including π . [ACMNA186]	✓			
Solve problems involving the use of percentages, including percentage increases and decreases, with and without digital technologies. [ACMNA187]	✓	✓	✓	✓
Solve a range of problems involving rates and ratios, with and without digital technologies. [ACMNA188]			✓	✓
Money and financial mathematics				
Solve problems involving profit and loss, with and without digital technologies. [ACMNA189]	✓			
Patterns and algebra				
Extend and apply the index laws to variables, using positive integer indices and the zero index. [ACMNA190]		✓		✓
Factorise algebraic expressions by identifying numerical factors. [ACMNA191]		✓		✓
Simplify algebraic expressions involving the four operations. [ACMNA192]		✓		✓
Linear and non-linear relationships				
Plot linear relationships on the Cartesian plane with and without the use of digital technologies. [ACMNA193]		✓		✓
Solve linear equations using algebraic and graphical techniques. Verify solutions by substitution. [ACMNA194]		✓		✓
Measurement and Geometry				
Using units of measurement				
Choose appropriate units of measurement for area and volume and convert from one unit to another. [ACMMG195]		✓		✓
Find perimeters and areas of parallelograms, trapeziums, rhombuses and kites. [ACMMG196]		✓		✓
Investigate the relationship between features of circles such as circumference, area, radius and diameter. Use formulas to solve problems involving circumference and area. [ACMMG197]		✓		
Develop the formulas for volumes of rectangular and triangular prisms and prisms in general. Use formulas to solve problems involving volume. [ACMMG198]				✓
Solve problems involving duration, including using 12- and 24-hour time within a single time zone. [ACMMG199]			✓	
Geometric reasoning				
Define congruence of plane shapes using transformations. [ACMMG200]				✓
Develop the conditions for congruence of triangles. [ACMMG201]				✓

Establish properties of quadrilaterals using congruent triangles and angle properties, and solve related numerical problems using reasoning. [ACMMG202]				✓
Statistics and Probability	Semester 1		Semester 2	
	Unit 1	Unit 2	Unit 3	Unit 4
Chance				
Identify complementary events and use the sum of probabilities to solve problems. [ACMSP204]	✓			
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]	✓			
Represent events in two-way tables and Venn diagrams and solve related problems. [ACMSP292]	✓			
Data representation and interpretation				
Investigate techniques for collecting data, including census, sampling and observation. [ACMSP284]			✓	
Explore the practicalities and implications of obtaining data through sampling using a variety of investigative processes. [ACMSP206]			✓	
Explore the variation of means and proportions of random samples drawn from the same population. [ACMSP293]			✓	
Investigate the effect of individual data values, including outliers, on the mean and median. [ACMSP207]			✓	

