

Australian Curriculum: Mathematics — Year 8

Year level plan-2023

Year 8 Level Description

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

At this year level:

- **understanding** includes describing patterns involving indices and recurring decimals, identifying commonalities between operations with algebra and arithmetic, connecting rules for linear relations with their graphs, explaining the purpose of statistical measures and explaining measurements of perimeter and area
- **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 and areas of common shapes and volumes of three-dimensional objects
- **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
- **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.

CURRICULUM	SEMESTER 1		SEMESTER 2	
	Term 1	Term 2	Term 3	Term 4
Unit description	<p>Number and place value</p> <ul style="list-style-type: none"> • 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)(a) <p>Patterns and algebra</p> <ul style="list-style-type: none"> • Extend and apply the distributive law to the expansion of algebraic expressions (ACMNA190) • Factorise algebraic expressions by identifying numerical factors (ACMNA191) • Simplify algebraic expressions involving the four operations (ACMNA192) 	<p>Real numbers</p> <ul style="list-style-type: none"> • Carry out the four operations with rational numbers and integers, using efficient mental and written strategies and appropriate digital technologies (ACMNA183)b • Investigate terminating and recurring decimals (ACMNA184) • Investigate the concept of irrational numbers, including pi (ACMNA186) <p>Linear and non-linear relationships</p> <ul style="list-style-type: none"> • 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] <p>Data representation and Interpretation</p> <ul style="list-style-type: none"> • 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] 	<p>Real numbers</p> <ul style="list-style-type: none"> • Solve problems involving the use of percentages, including percentage increases and decreases, with and without digital technologies. [ACMNA187] PSMT • Solve a range of problems involving rates and ratios, with and without digital technologies. [ACMNA188] PSMT <p>Money and financial mathematics</p> <ul style="list-style-type: none"> • Solve problems involving profit and loss, with and without digital technologies (ACMNA189) PSMT <p>Using units of measurement</p> <ul style="list-style-type: none"> • 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 	<p>Using units of measurement</p> <ul style="list-style-type: none"> • Solve problems involving duration, including 12- and 24-hour time within a single time zone (ACMMG199) <p>Geometric reasoning</p> <ul style="list-style-type: none"> • 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) <p>Chance</p> <ul style="list-style-type: none"> • 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, tree diagrams and Venn diagrams and solve related problems (ACMSP292)

		<ul style="list-style-type: none"> • 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] 	general. Use formulas to solve problems involving volume. [ACMMG198]	
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ASSESSMENT		SEMESTER 1			SEMESTER 2		
		Term 1	Term 2		Term 3	Term 4	
		Index laws and algebra - -AT1	Algebraic expressions, rational & irrational numbers -AT2	Linear relationships & statistics - AT3	Ratios, percentages & measurement – AT4	Mocktails – AT5	Geometric reasoning, time & probability- AT6
Range and balance of summative assessment conventions	Technique	Exam	Exam	Exam	Exam	Assignment	Exam
	Type of text	Short response	Short response	Short response	Short response	Report	Short response
	Mode	Written	Written	Written	Written	Written	Written
	Conditions	<ul style="list-style-type: none"> • Individual • Exam conditions • 1 lesson • Calculator • Formula sheet 	<ul style="list-style-type: none"> • Individual • Exam conditions • 1 lesson • Calculator allowed • Formula sheet 	<ul style="list-style-type: none"> • Individual • Exam conditions • 1 lesson • Calculator allowed • Formula sheet 	<ul style="list-style-type: none"> • Individual • Exam conditions • 2 lessons • Calculator allowed • Formula sheet 	<ul style="list-style-type: none"> • 4 lessons class • Feedback and adjustments provided on Draft 	<ul style="list-style-type: none"> • Individual • Exam conditions • 2 lessons • Calculator allowed • Formula sheet
		Aspects of the achievement standard					
solve everyday problems involving rates, ratios and percentages					✓	✓	
describe index laws and apply them to whole numbers		✓					
describe rational and irrational numbers			✓				
solve problems involving profit and loss					✓	✓	
Make connections between expanding and factorising algebraic expressions		✓					
solve problems relating to the volume of prisms					✓		
make sense of time duration in real applications							✓
identify conditions for the congruence of triangles and deduce the properties of quadrilaterals							✓

model authentic situations with two-way tables and Venn diagrams						✓
choose appropriate language to describe events and experiments						✓
explain issues related to the collection of data and the effect of outliers on means and medians in that data			✓			
use efficient mental and written strategies to carry out the four operations with integers	✓	✓				
simplify a variety of algebraic expressions		✓				
solve linear equations and graph linear relationships on the Cartesian plane			✓			
convert between units of measurement for area and volume				✓		
perform calculations to determine perimeter and area of parallelograms, rhombuses and kites				✓		
name the features of circles and calculate the areas and circumferences of circles				✓		
determine the probabilities of complementary events and calculate the sum of probabilities						✓

Term 1

Term 2

Term 3

Term 4



indicate opportunities that summative assessments provide for students to demonstrate evidence against aspects of the achievement standard

PROFICIENCIES

The Australian Curriculum: Mathematics proficiency strands are understanding, fluency, problem-solving and reasoning. They describe how content is explored or developed; that is, the thinking and doing of mathematics. The inclusion of the proficiencies in the curriculum is to ensure that student learning and student independence are at the centre of the curriculum. The curriculum focuses on developing increasingly sophisticated and refined mathematical proficiency skills. They enable students to respond to familiar and unfamiliar situations by employing mathematical strategies to make informed decisions and solve problems efficiently.

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.