

# Australian Curriculum: Mathematics — Year 7

## Year level plan-2023

### Year 7 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 in uses of indices with whole numbers, recognising equivalences between fractions, decimals, percentages and ratios, plotting points on the Cartesian plane, identifying angles formed by a transversal crossing a pair of lines, and connecting the laws and properties of numbers to algebraic terms and expressions
- **fluency** includes calculating accurately with integers, representing fractions and decimals in various ways, investigating best buys, finding measures of central tendency and calculating areas of shapes and volumes of prisms
- **problem-solving** includes formulating and solving authentic problems using numbers and measurements, working with transformations and identifying symmetry, calculating angles and interpreting sets of data collected through chance experiments
- **reasoning** includes applying the number laws to calculations, applying known geometric facts to draw conclusions about shapes, applying an understanding of ratio and interpreting data displays.

CURRICULUM	SEMESTER 1		SEMESTER 2	
	Term 1	Term 2	Term 3	Term 4
<b>Unit description</b>	<p><b>Real numbers</b></p> <ul style="list-style-type: none"> <li>• Compare fractions using equivalence. Locate and represent positive and negative fractions and mixed numbers on a number line (ACMNA152)</li> <li>• Solve problems involving addition and subtraction of fractions, including those with unrelated denominators (ACMNA153)</li> <li>• Multiply and divide fractions and decimals using efficient written strategies and digital technologies (ACMNA154)</li> <li>• Express one quantity as a fraction of another, with and without the use of digital technologies (ACMNA155)</li> <li>• Round decimals to a specified number of decimal places (ACMNA156)</li> <li>• Connect fractions, decimals and percentages and carry out simple conversions (ACMNA157)</li> </ul>	<p><b>Number and place value</b></p> <ul style="list-style-type: none"> <li>• Compare, order, add and subtract integers (ACMNA280)</li> </ul> <p><b>Number and place value</b></p> <ul style="list-style-type: none"> <li>• Apply the associative, commutative and distributive laws to aid mental and written computation (ACMNA151)</li> </ul> <p><b>Patterns and algebra</b></p> <ul style="list-style-type: none"> <li>• Introduce the concept of variables as a way of representing numbers using letters (ACMNA175)</li> <li>• Create algebraic expressions and evaluate them by substituting a given value for each variable (ACMNA176)</li> </ul> <p>Extend and apply the laws and properties of arithmetic to algebraic terms and expressions (ACMNA177)</p> <p><b>Linear and non-linear relationships</b></p> <ul style="list-style-type: none"> <li>• Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point (ACMNA178)</li> <li>• Investigate, interpret and analyse graphs from authentic data (ACMNA180)</li> <li>• Solve simple linear equations (ACMNA179)</li> </ul> <p><b>Geometric reasoning</b></p> <ul style="list-style-type: none"> <li>• Classify triangles according to their side and angle properties and describe quadrilaterals (ACMMG165)</li> <li>• Demonstrate that the angle sum of a triangle is <math>180^\circ</math> and use this to find the angle sum of a quadrilateral (ACMMG166)</li> </ul>	<p><b>Number and place value</b></p> <ul style="list-style-type: none"> <li>• Investigate index notation and represent whole numbers as products of powers of prime numbers (ACMNA149)</li> <li>• Investigate and use square roots of perfect square numbers (ACMNA150)</li> </ul> <p><b>Real numbers</b></p> <ul style="list-style-type: none"> <li>• Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies. (ACMNA158) PSMT</li> <li>• Recognise and solve problems involving simple ratios (ACMNA173) PSMT</li> </ul> <p><b>Money and financial mathematics</b></p> <ul style="list-style-type: none"> <li>• Investigate and calculate 'best buys', with and without digital technologies (ACMNA174) PSMT</li> </ul> <p><b>Data representation and interpretation</b></p> <ul style="list-style-type: none"> <li>• Identify and investigate issues involving numerical data collected from primary and secondary sources (ACMSP169)</li> <li>• Construct and compare a range of data displays including stem-and-leaf plots and dot plots (ACMSP170)</li> <li>• Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data (ACMSP171)</li> <li>• Describe and interpret data displays using median, mean and range (ACMSP172)</li> </ul> <p><b>This unit is supported by a Virtual Reality Module- Statistics &amp; Probability. Immersive Pedagogy supporting documentation is available as part of this module.</b></p>	<p><b>Using units of measurement</b></p> <ul style="list-style-type: none"> <li>• Establish the formulas for areas of rectangles, triangles and parallelograms and use these in problem solving (ACMMG159)</li> <li>• Calculate volumes of rectangular prisms (ACMMG160)</li> </ul> <p><b>Shape</b></p> <ul style="list-style-type: none"> <li>• Draw different views of prisms and solids formed from combinations of prisms (ACMMG161)</li> </ul> <p><b>Location and transformation</b></p> <ul style="list-style-type: none"> <li>• Describe translations, reflections in an axis, and rotations of multiples of <math>90^\circ</math> on the Cartesian plane using coordinates. Identify line and rotational symmetries (ACMMG181)</li> </ul> <p><b>Geometric reasoning</b></p> <ul style="list-style-type: none"> <li>• Identify corresponding, alternate and co-interior angles when two straight lines are crossed by a transversal (ACMMG163)</li> <li>• Investigate conditions for two lines to be parallel and solve simple numerical problems using reasoning (ACMMG164)</li> </ul> <p><b>Chance</b></p> <ul style="list-style-type: none"> <li>• Construct sample spaces for single-step experiments with equally likely outcomes (ACMSP167)</li> <li>• Assign probabilities to the outcomes of events and determine probabilities for events (ACMSP168)</li> </ul> <p><b>This unit is supported by a Virtual Reality Module- Measurement &amp; Geometry. Immersive Pedagogy supporting</b></p>

				documentation is available as part of this module.
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ASSESSMENT		SEMESTER 1			SEMESTER 2		
		Term 1	Term 2		Term 3		Term 4
		Number, fractions and percentage AT1	Geometric reasoning, cartesian planes, linear relationships and integers -AT2	Algebra with Variables, Laws and solving linear expressions-AT3	Index laws, percentages, ratios, money & statistics - AT4	Planning a party - AT5	Measurement, geometric reasoning & chance-AT6
Range and balance of summative assessment conventions	<b>Technique</b>	Exam	Exam	Exam	Exam	Assignment	Exam
	<b>Type of text</b>	Short response	Short response	Short Response	Short response	Report	Short response
	<b>Mode</b>	Written	Written	Written	Written	Written	Written
	<b>Conditions</b>	<ul style="list-style-type: none"> <li>Exam conditions</li> <li>1 lesson</li> <li>No Calculator allowed</li> <li>Formula sheet allowed</li> </ul>	<ul style="list-style-type: none"> <li>Exam conditions</li> <li>1 lessons</li> <li>Calculator allowed</li> <li>Formula sheet</li> </ul>	<ul style="list-style-type: none"> <li>Exam conditions</li> <li>1 lessons</li> <li>Calculator allowed</li> <li>Formula sheet</li> </ul>	<ul style="list-style-type: none"> <li>Exam conditions</li> <li>2 lessons</li> <li>Calculator allowed</li> <li>Formula sheet allowed</li> </ul>	<ul style="list-style-type: none"> <li>4 lessons of class time</li> <li>Feedback and adjustments provided on draft</li> </ul>	<ul style="list-style-type: none"> <li>Exam conditions</li> <li>2 lessons</li> <li>Calculator allowed</li> <li>Formula sheet allowed</li> </ul>
Aspects of the achievement standard							
solve problems involving the comparison, addition and subtraction of integers		✓					
make the connections between whole numbers and index notation and the relationship between perfect squares and square roots					✓		
solve problems involving percentages and all four operations with fractions and decimals	✓				✓		
compare the cost of items to make financial decisions.					✓	✓	
represent numbers using variables				✓			
connect the laws and properties for numbers to algebra				✓			
interpret simple linear representations and model authentic information		✓					
describe different views of three-dimensional objects							✓
represent transformations in the Cartesian plane							✓
solve simple numerical problems involving angles formed by a transversal crossing two lines							✓
identify issues involving the collection of continuous data					✓		

describe the relationship between the median and mean in data displays				✓		
use fractions, decimals and percentages, and their equivalences	✓					
express one quantity as a fraction or percentage of another	✓					
solve simple linear equations and evaluate algebraic expressions after numerical substitution			✓			
assign ordered pairs to given points on the Cartesian plane		✓				
use formulas for the area and perimeter of rectangles and calculate volumes of rectangular prisms						✓
classify triangles and quadrilaterals		✓				
name the types of angles formed by a transversal crossing parallel line						✓
determine the sample space for simple experiments with equally likely outcomes and assign probabilities to those outcomes						✓
calculate mean, mode, median and range for data sets					✓	
construct stem-and-leaf plots and dot-plots					✓	

Term 1 Term 2 Term 3 Term 4 ✓ indicates 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.