

# Year 8 plan — Australian Curriculum: Mathematics

Identify curriculum	Year level description	<p>The proficiency strands <b>understanding, fluency, problem-solving and reasoning</b> 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.</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 with 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 and areas of common shapes and volumes of 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> <p><b>At IPC, relevant learning is experienced that encourages boys succeed in Maths and provides a foundation of understanding for the later years of education. The boys will undertake 8 X 50 minute lessons per fortnight.</b></p>			
	Achievement standard	<p>By the end of Year 8, students <b>solve</b> everyday problems involving rates, ratios and percentages. They <b>describe</b> index laws and <b>apply</b> them to whole numbers. They <b>describe</b> rational and irrational numbers. Students <b>solve</b> problems involving profit and loss. They make connections between expanding and factorising algebraic expressions. Students <b>solve</b> problems relating to the volume of prisms. They make sense of time duration in real applications. They <b>identify</b> conditions for the congruence of triangles and <b>deduce</b> the properties of quadrilaterals. Students model authentic situations with two-way tables and Venn diagrams. They choose appropriate language to <b>describe</b> events and experiments. They <b>explain</b> 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 <b>solve</b> 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 <b>calculate</b> the areas and circumferences of circles. Students determine the probabilities of complementary events and <b>calculate</b> the sum of probabilities.</p>			
		<p>Source: Australian Curriculum, Assessment and Reporting Authority (ACARA), <i>Australian Curriculum v8.2: Mathematics for Foundation–10</i>, &lt;<a href="http://www.australiancurriculum.edu.au/Mathematics/Curriculum/F-10">www.australiancurriculum.edu.au/Mathematics/Curriculum/F-10</a>&gt;. Text: 8 Essential Mathematics for the Australian Curriculum (second edition)</p>			
Teaching and learning	Term overview	<p><b>Term 1</b></p> <p>Ch 1 – Integers Ch 2 – Geometry Ch 5 – Algebra</p> <ul style="list-style-type: none"> <li>• <b>Consolidation</b> Compare, order, add and subtract integers (ACMNA280)</li> <li>• Carry out the four operations with rational numbers and integers, using efficient mental and written strategies and appropriate digital technologies (ACMNA183)</li> <li>• Establish properties of quadrilaterals using <b>congruent triangles</b> and <b>angle</b> properties, and solve related numerical problems using reasoning (ACMMG202)</li> <li>• Extend and apply the <b>distributive</b> law to the expansion of algebraic expressions (ACMNA190)</li> <li>• <b>Factorise</b> algebraic expressions by identifying numerical factors (ACMNA191)</li> <li>• Simplify algebraic expressions involving the four operations (ACMNA192)</li> </ul>	<p><b>Term 2</b></p> <p>Ch 3 – Fractions, Decimals &amp; Percentages Ch 4 – Measurement Ch 5 - Algebra</p> <ul style="list-style-type: none"> <li>• Use <b>index</b> notation with numbers to establish the <b>index</b> laws with positive integral indices and the zero <b>index</b> (ACMNA182)</li> <li>• Investigate terminating and recurring decimals (ACMNA184)</li> <li>• Investigate the concept of irrational numbers, including <math>\pi</math> (ACMNA186)</li> <li>• Solve problems involving the use of percentages, including <b>percentage</b> increases and decreases, with and without digital technologies (ACMNA187)</li> <li>• Solve problems involving profit and loss, with and without digital technologies (ACMNA189)</li> <li>• Choose appropriate units of measurement for area and <b>volume</b> and convert from one unit to another (ACMMG195)</li> <li>• Find perimeters and areas of parallelograms, trapeziums, rhombuses and kites (ACMMG196)</li> <li>• Investigate the relationship between features of circles such as circumference, area, radius and diameter. Use formulas to solve problems involving circumference and area (ACMMG197)</li> <li>• Develop formulas for volumes of rectangular and triangular prisms and prisms in general. Use formulas to solve problems involving <b>volume</b>(ACMMG198)</li> <li>• Solve problems involving duration, including using 12- and 24-hour time within a single time zone (ACMMG199)</li> </ul>	<p><b>Term 3</b></p> <p>Ch 6 – Ratios &amp; Rates Ch 8 – Probability &amp; Statistics Ch 10 – Transformation &amp; Congruence</p> <ul style="list-style-type: none"> <li>• Solve a range of problems involving rates and ratios, with and without digital technologies (ACMNA188)</li> <li>• Investigate techniques for collecting <b>data</b>, including <b>census</b>, sampling and observation (ACMSP284)</li> <li>• Explore the variation of means and proportions of random samples drawn from the same <b>population</b> (ACMSP293)</li> <li>• Investigate the effect of individual <b>data</b> values, including outliers, on the <b>mean</b> and <b>median</b>(ACMSP207)</li> <li>• Represent events in two-way tables and Venn diagrams and solve related problems (ACMSP292)</li> <li>• Identify <b>complementary events</b> and use the <b>sum</b> of probabilities to solve problems (ACMSP204)</li> <li>• 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)</li> <li>• Explore the practicalities and implications of obtaining <b>data</b> through sampling using a variety of investigative processes (ACMSP206)</li> <li>• Define <b>congruence</b> of plane shapes using transformations (ACMMG200)</li> </ul>	<p><b>Term 4</b></p> <p>Ch 7 – Equations Ch 9 – Straight Line Graphs</p> <ul style="list-style-type: none"> <li>• Plot linear relationships on the Cartesian plane with and without the use of digital technologies (ACMNA193)</li> <li>• Solve linear equations using algebraic and graphical techniques. Verify solutions by substitution (ACMNA194)</li> </ul>

			<ul style="list-style-type: none"> <li>Develop the conditions for <b>congruence</b> of triangles (ACMMG201)</li> <li>Establish properties of quadrilaterals using <b>congruent triangles</b> and <b>angle</b> properties, and solve related numerical problems using reasoning (ACMMG202)</li> </ul>	
--	--	--	--	--

Teaching and learning	<b>Aboriginal and Torres Strait Islander perspectives</b> 	Ignatius Park College has begun a two partnership with QUT to develop the Prime Futures program; teaching Yumi-Deadly Maths. It involves professional development, implementing practical resources and strategies that will engage indigenous students from ‘their’ perspective and reference of knowledge. This is an exciting and developing project, with the prospect of advantaging all students understanding and appreciation of Mathematics. Mathematics provides opportunities to explore aspects of Australian Indigenous knowing in connection to, and with guidance from, the communities who own them. Using a respectful inquiry approach, students have the opportunity to explore mathematical concepts in Aboriginal and Torres Strait Islander lifestyles including knowledge of number, space, measurement and time. Through these experiences, students have opportunities to learn that Aboriginal peoples and Torres Strait Islander peoples have sophisticated applications of mathematical concepts which may be applied in other peoples’ ways of knowing.							
	<b>General capabilities and cross-curriculum priorities</b>	 Literacy  Numeracy  ICT capability  Critical /creative thinking  Ethical behaviour  Personal/social capability  Intercultural understanding							
Develop assessment	<b>Assessment</b> For advice and guidelines on assessment, see <a href="http://www.qsa.qld.edu.au">www.qsa.qld.edu.au</a>	A folio is a targeted selection of evidence of student learning and includes a range of responses to a variety of assessment techniques. A folio is used to make an overall on-balance judgment about student achievement and progress at appropriate points and informs the reporting process.							
		<b>Term 1</b>     		<b>Term 2</b>    		<b>Term 3</b>    		<b>Term 4</b>    	
		<b>Week</b>	<b>Assessment instrument</b>	<b>Week</b>	<b>Assessment instrument</b>	<b>Week</b>	<b>Assessment instrument</b>	<b>Week</b>	<b>Assessment instrument</b>
		8	Supervised assessment: Short response Understanding & Fluency	6	Formative - Progress Test	3	Formative Problem-solving and Modelling Task (PSMT)	7 - 8	Extended Exam: Short response with problem-solving and reasoning
				10	Extended Exam: Short response with problem-solving and reasoning	10	Formative – Topic Test		
Make judgments &	<b>Moderation</b>	Teachers develop tasks and plan units. Teachers mark their own class and meet to discuss levels and ensure consistency of judgments.	Teachers develop tasks and plan units. Teachers co-mark tasks to ensure consistency of judgments. Curriculum leaders randomly sample folios to check for consistency of judgments.	Teachers develop tasks and plan units. Teachers mark their own class and meet to discuss levels and ensure consistency of judgments.	Teachers develop tasks and plan units. Teachers mark their own class and meet to moderate to ensure consistency of judgments. Curriculum leaders randomly sample folios to check for consistency of teacher judgments.				

Year 8 Mathematics: review for balance and coverage of content descriptions

Number and Algebra	1	2	3	4
<b>Number and place value</b>				
Use <b>index</b> notation with numbers to establish the <b>index</b> laws with positive integral indices and the zero <b>index</b> (ACMNA182)		✓		
Carry out the four operations with rational numbers and integers, using efficient mental and written strategies and appropriate digital technologies (ACMNA183)	✓			
<b>Real Numbers</b>				
Investigate terminating and recurring decimals (ACMNA184)		✓		
Investigate the concept of irrational numbers, including $\pi$ (ACMNA186)		✓		
Solve problems involving the use of percentages, including <b>percentage</b> increases and decreases, with and without digital technologies (ACMNA187)		✓		
Solve a range of problems involving rates and ratios, with and without digital technologies (ACMNA188)			✓	
<b>Money and financial mathematics</b>				
Solve problems involving profit and loss, with and without digital technologies (ACMNA189)		✓		
<b>Patterns and algebra</b>				
Extend and apply the <b>distributive</b> law to the expansion of algebraic expressions (ACMNA190)	✓			
<b>Factorise</b> algebraic expressions by identifying numerical factors (ACMNA191)	✓			
Simplify algebraic expressions involving the four operations (ACMNA192)	✓			
<b>Linear and non-linear relationships</b>				
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	1	2	3	4
<b>Using units of measurement</b>				
Choose appropriate units of measurement for area and <b>volume</b> 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 formulas for volumes of rectangular and triangular prisms and prisms in general. Use formulas to solve problems involving <b>volume</b> (ACMMG198)		✓		
Solve problems involving duration, including using 12- and 24-hour time within a single time zone (ACMMG199)		✓		
<b>Geometric reasoning</b>				
Define <b>congruence</b> of plane shapes using transformations (ACMMG200)			✓	
Develop the conditions for <b>congruence</b> of triangles (ACMMG201)			✓	
Establish properties of quadrilaterals using <b>congruent triangles</b> and <b>angle</b> properties, and solve related numerical problems using reasoning (ACMMG202)	✓		✓	

Statistics and Probability	1	2	3	4
<b>Chance</b>				
Identify <b>complementary events</b> and use the <b>sum</b> 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)			✓	
<b>Data representation and interpretation</b>				
Investigate techniques for collecting <b>data</b> , including <b>census</b> , sampling and observation (ACMSP284)			✓	
Explore the practicalities and implications of obtaining <b>data</b> through sampling using a variety of investigative processes (ACMSP206)			✓	
Explore the variation of means and proportions of random samples drawn from the same <b>population</b> (ACMSP293)			✓	
Investigate the effect of individual <b>data</b> values, including outliers, on the <b>mean</b> and <b>median</b> (ACMSP207)			✓	