

Year 10 Plan — Australian Curriculum: Mathematics

Identify curriculum	Year level description	<p>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.</p> <ul style="list-style-type: none"> understanding includes applying the four operations to algebraic fractions, finding unknowns in formulas after substitution, making the connection between equations of relations and their graphs, comparing simple and compound interest in financial contexts and determining probabilities of two- and three-step experiments fluency includes factorising and expanding algebraic expressions, using a range of strategies to solve equations and using calculations to investigate the shape of data sets problem-solving includes calculating the surface area and volume of a diverse range of prisms to solve practical problems, finding unknown lengths and angles using applications of trigonometry, using algebraic and graphical techniques to find solutions to simultaneous equations and inequalities and investigating independence of events reasoning includes formulating geometric proofs involving congruence and similarity, interpreting and evaluating media statements and interpreting and comparing data sets. <p>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.</p>			
	Achievement standard	<p>By the end of Year 10, students recognise the connection between simple and compound interest. They solve problems involving linear equations and inequalities. They make the connections between algebraic and graphical representations of relations. Students solve surface area and volume problems relating to composite solids. They recognise the relationships between parallel and perpendicular lines. Students apply deductive reasoning to proofs and numerical exercises involving plane shapes. They compare data sets by referring to the shapes of the various data displays. They describe bivariate data where the independent variable is time. Students describe statistical relationships between two continuous variables. They evaluate statistical reports.</p> <p>Students expand binomial expressions and factorise monic quadratic expressions. They find unknown values after substitution into formulas. They perform the four operations with simple algebraic fractions. Students solve simple quadratic equations and pairs of simultaneous equations. They use triangle and angle properties to prove congruence and similarity. Students use trigonometry to calculate unknown angles in right-angled triangles. Students list outcomes for multi-step chance experiments and assign probabilities for these experiments. They calculate quartiles and inter-quartile ranges.</p> <p>Source: Australian Curriculum, Assessment and Reporting Authority (ACARA), <i>Australian Curriculum v8.2: Mathematics for Foundation–10</i>, <www.australiancurriculum.edu.au/Mathematics/Curriculum/F-10>. TEXT: 10 & 10A Essential Mathematics for the Australian Curriculum (second edition)</p>			
Teaching and learning	Term overview	Term 1	Term 2	Term 3	Term 4
		<p>Ch 1 - Linear & Simultaneous Equations Ch 2 – Geometry Ch 3 - Surds</p> <ul style="list-style-type: none"> Factorise algebraic expressions by taking out a common algebraic factor (ACMNA230) Apply the four operations to simple algebraic fractions with numerical denominators. (ACMNA232) Substitute values into formulas to determine an unknown (ACMNA234) Solve problems involving linear equations, including those derived from formulas (ACMNA235) Solve linear inequalities and graph their solutions on a number line (ACMNA236) Solve linear simultaneous equations, using algebraic and graphical techniques, including using digital technology (ACMNA237) Solve problems involving parallel and perpendicular lines (ACMNA238) Solve linear equations involving simple algebraic fractions (ACMNA240) Formulate proofs involving congruent triangles and angle properties (ACMMG243) Apply logical reasoning, including the use of congruence and similarity, to proofs and numerical exercises involving plane shapes (ACMMG244) <p>10A</p>	<p>Ch 3 – Indices Ch 4 – Trigonometry Ch 5 - Quadratics</p> <ul style="list-style-type: none"> Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies (ACMNA229) Simplify algebraic products and quotients using index laws (ACMNA231) Factorise algebraic expressions by taking out a common algebraic factor (ACMNA230) Expand binomial products and factorise monic quadratic expressions using a variety of strategies (ACMNA233) Solve simple quadratic equations using a range of strategies (ACMNA241) Solve right-angled triangle problems including those involving direction and angles of elevation and depression (ACMMG245) <p>10A</p> <ul style="list-style-type: none"> Establish the sine, cosine and area rules for any triangle and solve related problems (ACMMG273) Use the unit circle to define trigonometric functions, and graph them with and without the use of digital technologies (ACMMG274) Solve simple trigonometric equations (ACMMG275) Apply Pythagoras' Theorem and trigonometry to solving three-dimensional problems in right-angled triangles (ACMMG276) Factorise monic and non-monic quadratic expressions and solve a wide range of 	<p>Ch 6 – Measurement Ch 7 – Parabolas and other Graphs Ch 10 – Logarithms 10ABC (10A)</p> <ul style="list-style-type: none"> Solve problems involving surface area and volume for a range of prisms, cylinders and composite solids (ACMMG242) Factorise algebraic expressions by taking out a common algebraic factor (ACMNA230) Expand binomial products and factorise monic quadratic expressions using a variety of strategies (ACMNA233) Substitute values into formulas to determine an unknown (ACMNA234) Explore the connection between algebraic and graphical representations of relations such as simple quadratics, circles and exponentials using digital technology as appropriate (ACMNA239) Solve simple quadratic equations using a range of strategies (ACMNA241) <p>10A</p> <ul style="list-style-type: none"> Solve problems involving surface area and volume of right pyramids, right cones, spheres and related composite solids (ACMMG271) Apply Pythagoras' Theorem to solving three-dimensional problems in right-angled triangles (ACMMG276) Apply understanding of polynomials to sketch a range of curves and describe the features of these curves from their equation (ACMNA268) 	<p>Ch 8 – Probability Ch 9 – Statistics</p> <ul style="list-style-type: none"> Describe the results of two- and three-step chance experiments, both with and without replacements, assign probabilities to outcomes and determine probabilities of events. Investigate the concept of independence (ACMSP246) Use the language of 'if ...then', 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language (ACMSP247) Determine quartiles and interquartile range (ACMSP248) Construct and interpret box plots and use them to compare data sets (ACMSP249) Compare shapes of box plots to corresponding histograms and dot plots (ACMSP250) Use scatter plots to investigate and comment on relationships between two numerical variables (ACMSP251) Investigate and describe bivariate numerical data where the independent variable is time (ACMSP252) Evaluate statistical reports in the media and other places by linking claims to displays, statistics and representative data (ACMSP253) <p>10A</p>

	<ul style="list-style-type: none"> Define rational and irrational numbers and perform operations with surds and fractional indices (ACMNA264) 	<p>quadratic equations derived from a variety of contexts (ACMNA269)</p> <ul style="list-style-type: none"> Define rational and irrational numbers and perform operations with surds and fractional indices (ACMNA264) Solve simple exponential equations (ACMNA270) 	<ul style="list-style-type: none"> Describe, interpret and sketch parabolas, hyperbolas, circles and exponential functions and their transformations (ACMNA267) Use the definition of a logarithm to establish and apply the laws of logarithms (ACMNA265) 	<ul style="list-style-type: none"> Investigate reports of studies in digital media and elsewhere for information on their planning and implementation (ACMSP277) Calculate and interpret the mean and standard deviation of data and use these to compare data sets (ACMSP278) Use information technologies to investigate bivariate numerical datasets. Where appropriate use a straight line to describe the relationship allowing for variation (ACMSP279)
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Teaching and learning	Aboriginal and Torres Strait Islander perspectives 	<p>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.</p> <p>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.</p>							
	General capabilities and cross-curriculum priorities	 Literacy  Numeracy  ICT capability  Critical /creative thinking  Ethical behaviour  Personal/social capability  Intercultural understanding							
Develop assessment	Assessment For advice and guidelines on assessment, see www.qsa.qld.edu.au	<p>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.</p>							
		Term 1     		Term 2    		Term 3    		Term 4    	
		Week	Assessment instrument	Week	Assessment instrument	Week	Assessment instrument	Week	Assessment instrument
		8	Supervised assessment: Exam - Short response (Written)	10	Mathematical investigation: (Written) Extended Exam Term 1 & 2 Content Understanding and Fluency and Problem solving and reasoning.	9-10	Supervised assessment: x2 exams Understanding and fluency and Problem solving and reasoning	3-6	PSMT
Make judgments & use feedback	Moderation	<p>Teachers develop tasks and plan units.</p> <p>Teachers co-mark tasks to ensure consistency of judgments.</p>	<p>Teachers develop tasks and plan units.</p> <p>Teachers identify A–E samples before marking tasks, and moderate to ensure consistency of judgments.</p> <p>Teachers co-mark tasks to ensure consistency of judgments.</p> <p>Curriculum leaders randomly sample folios to check for consistency of judgments.</p>	<p>Teachers develop tasks and plan units.</p> <p>Teachers co-mark tasks to ensure consistency of judgments.</p>	<p>Teachers develop tasks and plan units.</p> <p>Teachers co-mark tasks to ensure consistency of judgments.</p> <p>Curriculum leaders randomly sample folios to check for consistency of judgments.</p>				

Year 10 Mathematics: review for balance and coverage of content descriptions

Number and Algebra	1	2	3	4
Money and financial mathematics				
Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies (ACMNA229)		✓		
Patterns and algebra				
Factorise algebraic expressions by taking out a common algebraic factor (ACMNA230)	✓	✓	✓	
Simplify algebraic products and quotients using index laws (ACMNA231)		✓		
Apply the four operations to simple algebraic fractions with numerical denominators (ACMNA232)	✓			
Expand binomial products and factorise monic quadratic expressions using a variety of strategies (ACMNA233)		✓	✓	
Substitute values into formulas to determine an unknown (ACMNA234)	✓	✓	✓	✓
Linear and non-linear relationships				
Solve problems involving linear equations, including those derived from formulas (ACMNA235)	✓			
Solve linear inequalities and graph their solutions on a number line (ACMNA236)	✓			
Solve linear simultaneous equations, using algebraic and graphical techniques, including using digital technology (ACMNA237)	✓			
Solve problems involving parallel and perpendicular lines (ACMNA238)	✓			
Explore the connection between algebraic and graphical representations of relations such as simple quadratics, circles and exponentials using digital technology as appropriate (ACMNA239)			✓	
Solve linear equations involving simple algebraic fractions (ACMNA240)	✓			
Solve simple quadratic equations using a range of strategies (ACMNA241)		✓	✓	

Measurement and Geometry	1	2	3	4
Using units of measurement				
Solve problems involving surface area and volume for a range of prisms, cylinders and composite solids (ACMMG242)			✓	
Geometric reasoning				
Formulate proofs involving congruent triangles and angle properties (ACMMG243)	✓			
Apply logical reasoning, including the use of congruence and similarity , to proofs and numerical exercises involving plane shapes (ACMMG244)	✓			
Pythagoras and trigonometry				
Solve right-angled triangle problems including those involving direction and angles of elevation and depression (ACMMG245)		✓	✓	

Statistics and Probability	1	2	3	4
Chance				
Describe the results of two- and three-step chance experiments, both with and without replacements, assign probabilities to outcomes and determine probabilities of events. Investigate the concept of independence (ACMSP246)				✓
Use the language of 'if ...then', 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language (ACMSP247)				✓
Data representation and interpretation				
Determine quartiles and interquartile range (ACMSP248)				✓
Construct and interpret box plots and use them to compare data sets (ACMSP249)				✓
Compare shapes of box plots to corresponding histograms and dot plots (ACMSP250)				✓
Use scatter plots to investigate and comment on relationships between two numerical variables (ACMSP251)				✓
Investigate and describe bivariate numerical data where the independent variable is time (ACMSP252)				✓
Evaluate statistical reports in the media and other places by linking claims to displays, statistics and representative data (ACMSP253)				✓

Year 10 A Mathematics: Review for balance and coverage of content descriptions

Number and Algebra	1	2	3	4
Real Numbers				
Define rational and irrational numbers and perform operations with surds and fractional indices (ACMNA264)	✓	✓		
Use the definition of a logarithm to establish and apply the laws of logarithms (ACMNA265)			✓	
Patterns and algebra				
Investigate the concept of a polynomial and apply the factor and remainder theorems to solve problems (ACMNA266)				
Linear and non-linear relationships				
Describe, interpret and sketch parabolas, hyperbolas, circles and exponential functions and their transformations (ACMNA267)			✓	
Solve simple exponential equations (ACMNA270)		✓	✓	
Apply understanding of polynomials to sketch a range of curves and describe the features of these curves from their equation (ACMNA268)				
Factorise monic and non-monic quadratic expressions and solve a wide range of quadratic equations derived from a variety of contexts (ACMNA269)		✓		

Measurement and Geometry	1	2	3	4
Using units of measurement				
Solve problems involving surface area and volume of right pyramids, right cones, spheres and related composite solids (ACMMG271)			✓	
Geometric reasoning				
Prove and apply angle and chord properties of circles (ACMMG272)				
Pythagoras and trigonometry				
Establish the sine , cosine and area rules for any triangle and solve related problems (ACMMG273)		✓		
Use the unit circle to define trigonometric functions, and graph them with and without the use of digital technologies (ACMMG274)		✓		
Solve simple trigonometric equations (ACMMG275)		✓		
Apply Pythagoras' Theorem and trigonometry to solving three-dimensional problems in right-angled triangles (ACMMG276)		✓	✓	

Statistics and Probability	1	2	3	4
Chance				
Investigate reports of studies in digital media and elsewhere for information on their planning and implementation (ACMSP277)				✓
Data representation and interpretation				
Calculate and interpret the mean and standard deviation of data and use these to compare data sets (ACMSP278)				✓
Use information technologies to investigate bivariate numerical datasets . Where appropriate use a straight line to describe the relationship allowing for variation (ACMSP279)				✓