

Year 10A Level Description

The 10A content descriptions are optional and are intended for students who require additional content to enrich and extend their mathematical study whilst completing the common Year 10 curriculum. It is not anticipated that all students will attempt the 10A content, but doing so would be advantageous for those intending to pursue Mathematical Methods (Course C) or Specialist Mathematics (Course D) in the senior secondary years. A selection of topics from the 10A curriculum can be completed according to the needs and interests of students.

CURRICULUM	SEMESTER 1		SEMESTER 2	
	Term 1	Term 2	Term 3	Term 4
Unit description	<p>Patterns and algebra</p> <ul style="list-style-type: none"> Simplify algebraic products and quotients using index laws (ACMNA231) Apply the four operations to simple algebraic fractions with numerical denominators (ACMNA232) Substitute values into formulas to determine an unknown (ACMNA234) <p>Pythagoras and Trigonometry</p> <ul style="list-style-type: none"> Solve right-angled triangle problems including those involving direction and angles of elevation and depression (ACMMG245) Establish the sine, cosine and area rules for any triangle and solve related problems (ACMMG273) 10A Use the unit circle to define trigonometric functions, and graph them with and without the use of digital technologies (ACMMG274) 10A Solve simple trigonometric equations (ACMMG275) 10A Apply Pythagoras' Theorem and trigonometry to solving three-dimensional problems in right-angled triangles (ACMMG276) 10A 	<p>Linear and non-linear equations</p> <ul style="list-style-type: none"> Solve problems involving linear equations, including those derived from formulas (ACMNA235) Solve linear inequalities and graph their solutions on a number line (ACMNA236) PSMT Solve linear simultaneous equations, using algebraic and graphical techniques, including using digital technology (ACMNA237) PSMT Solve problems involving parallel and perpendicular lines (ACMNA238) <p>Using units of measurement</p> <ul style="list-style-type: none"> Solve problems involving surface area and volume for a range of prisms, cylinders and composite solids (ACMMG242) Solve problems involving surface area and volume of right pyramids, right cones, spheres and related composite solids (ACMMG271) 10A <p>Real numbers</p> <ul style="list-style-type: none"> Define rational and irrational numbers and perform operations with surds and fractional indices (ACMNA264) 10A Use the definition of a logarithm to establish and apply the laws of logarithms (ACMNA265) 10A <p>Money and financial mathematics</p> <ul style="list-style-type: none"> Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies (ACMNA229) 	<p>Data representation and interpretation</p> <ul style="list-style-type: none"> (ACMSP248) (ACMSP249) (ACMSP250) (ACMSP251) (ACMSP252) (ACMSP253) AND Calculate and interpret the mean and standard deviation of data and use these to compare data sets (ACMSP278) 10A Use information technologies to investigate bivariate numerical data sets. Where appropriate use a straight line to describe the relationship allowing for variation (ACMSP279) 10A <p>Chance</p> <ul style="list-style-type: none"> Investigate reports of studies in digital media and elsewhere for information on their planning and implementation (ACMSP277) 10A <p>Patterns and algebra</p> <ul style="list-style-type: none"> 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) <p>Linear and non-linear equations</p> <ul style="list-style-type: none"> (ACMNA240) (ACMNA239) (ACMNA241) AND Describe, interpret and sketch parabolas, hyperbolas, circles and exponential functions and their transformations (ACMNA267) 10A Apply understanding of polynomials to sketch a range of curves and describe the features of these curves from their equation (ACMNA268) 10A 	<p>Chance</p> <ul style="list-style-type: none"> Describe the results of two- and three-step chance experiments, both with and without replacements (ACMSP246) Use the language of 'if...then', 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language (ACMSP247) <p>Linear and non-linear relationships</p> <ul style="list-style-type: none"> Solve simple exponential equations (ACMNA270) 10A <p>Patterns and algebra</p> <ul style="list-style-type: none"> Investigate the concept of a polynomial and apply the factor and remainder theorems to solve problems (ACMNA266) 10A <p>Geometric reasoning</p> <ul style="list-style-type: none"> 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) Prove and apply angle and chord properties of circles (ACMMG272) 10A

			<ul style="list-style-type: none"> Factorise monic and non-monic quadratic expressions and solve a wide range of quadratic equations derived from a variety of contexts (ACMNA269) 10A 	
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ASSESSMENT		SEMESTER 1		SEMESTER 2	
		Term 1	Term 2	Term 3	Term 4
		Index laws, algebraic fractions, solving linear equations & trigonometry, trig equations and unit circle- AT1	Money, linear relationships & measurement with volume & surface area, surds and logarithms-AT2	Algebra, factorising and expanding quadratics, statistics, non-linear relationships- AT3	Geometric reasoning, probability, factor theorem and exponential equations- AT4
Range and balance of summative assessment conventions	Technique	Exam	Exam	Exam	Exam
	Type of text	Short response	Short response	Short Response	Short response
	Mode	Written	Written	Written	Written
	Conditions	<ul style="list-style-type: none"> Individual Exam conditions 2 lessons Calculator allowed Formula sheet provided	<ul style="list-style-type: none"> 4 lessons of class time Feedback and adjustments provided on Draft 	<ul style="list-style-type: none"> Individual Exam conditions 2 lessons Calculator allowed Formula sheet provided	<ul style="list-style-type: none"> Individual Exam conditions 2 lessons Calculator allowed Formula sheet provided
Aspects of the achievement standard					
recognise the connection between simple and compound interest			✓		
solve problems involving linear equations and inequalities	✓		✓		
make the connections between algebraic and graphical representations of relations				✓	
solve surface area and volume problems relating to composite solids			✓		
recognise the relationships between parallel and perpendicular lines			✓		
apply deductive reasoning to proofs and numerical exercises involving plane shapes					✓
compare data sets by referring to the shapes of the various data displays				✓	
describe bivariate data where the independent variable is time				✓	
describe statistical relationships between two continuous variables				✓	
evaluate statistical reports				✓	

expand binomial expressions and factorise monic quadratic expressions			✓	
find unknown values after substitution into formulas	✓			
perform the four operations with simple algebraic fractions	✓			
solve simple quadratic equations and pairs of simultaneous equations			✓	
use triangle and angle properties to prove congruence and similarity				✓
use trigonometry to calculate unknown angles in right-angled triangles	✓			
list outcomes for multi-step chance experiments and assign probabilities for these experiments				✓
calculate quartiles and inter-quartile ranges			✓	

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.

<p>Understanding</p> <p>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.</p>	<p>Fluency</p> <p>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.</p>	<p>Problem-solving</p> <p>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.</p>	<p>Reasoning</p> <p>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.</p>
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