

# Year 10 Extension Mathematics Course

January 1

# 2016

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Mathematics program for Year 10 Extension including assessment schedule and weightings

## Summary of Assessment Schedule

Assessment Type	Approximate Time	Weighting (over entire year)	
Test 1	Term 1 Week 6	6.25%	
EPW 1	Term 1 Week 10	10%	
Test 2	Term 2 Week 2	6.25%	
Mental Test 1	Semester 1	2.5%	
Mental Test 2	Semester 1	2.5%	
Formative Assessments	Ongoing	7.5%	
Teacher Judgement	Semester 1	2.5%	
Examination	Term 2 Week 6	12.5%	
<b>Sub-Total for Semester 1</b>			<b>50%</b>
EPW 2	Term 2 Week 8	10%	
Test 3	Term 3 Week 2	6.25%	
Test 4	Term 3 Week 10	6.25%	
Mental Test 1	Semester 2	2.5%	
Mental Test 2	Semester 2	2.5%	
Formative Assessments	Ongoing	7.5%	
Teacher Judgement	Semester 2	2.5%	
Examination	Term 4 Week 6	12.5%	
<b>Sub-Total for Semester 2</b>			<b>50%</b>
<b>Total for year</b>			<b>100%</b>

Content for Year 10 Extension	SCASA Standards	Dwyer Reference	Extra Resource Cambridge	Teaching Strategy References	Assessments
Weeks 1-3 Algebraic Operations <ul style="list-style-type: none"> <li>Factorise algebraic expressions by taking out a common algebraic factor.</li> <li>Simplify algebraic products and quotients using index laws.</li> <li>Apply the four operations to simple algebraic fractions with numerical denominators.</li> </ul>	A Simplifies sums and differences of algebraic fractions with unrelated denominators. Applies index laws to simplify complex algebraic products and quotients involving integral indices.	Chapter 1	Pages 4- 23		
	B Simplifies sums and differences of algebraic fractions with related denominators. Applies index laws to simplify algebraic products and quotients involving integral indices.				
	C Simplifies sums and differences of algebraic fractions with like denominators. Applies index laws to simplify algebraic products and quotients involving non-negative integral indices.				
Week 3-5 Linear Equations/Inequalities <ul style="list-style-type: none"> <li>Solve problems involving linear equations including those derived from formulas and word problems.</li> <li>Solve linear inequalities and graph their solution on a number line.</li> <li>Solving linear simultaneous equations both algebraically and graphically including those derived from word problems.</li> </ul>	A Formulates a pair of simultaneous linear equations from a word problem and determines the simultaneous solution in a variety of ways. Formulates and solves a linear equation or inequality involving fractions from a complex word problem, verifies the solution/s and illustrates the solutions of inequalities with a suitable graph.	Chapter 2 and Chapter 7 Pages 88 - 91	Pages 55 - 66		
	B Graphs a pair of linear relations given in a variety of ways, writes the simultaneous solution and justifies algebraically. Rearranges linear rules into forms to make conclusions about the geometric relationship. Uses algebraic techniques to solve a pair of simultaneous linear equations. Solves problems involving linear equations and inequalities involving fractions. Illustrates the solution of inequalities graphically.				
	C Graphs a pair of simple linear relations and writes the simultaneous solution. Solves problems involving linear equations or inequalities.				
	Solves problems involving linear equations or inequalities.				
Week 6 – 8 Area and Volume <ul style="list-style-type: none"> <li>Solves problems involving surface area and volume for a range of prisms, cylinders and composite solids.</li> <li>Solves problems involving surface area and volume of right pyramids, right cones, spheres and related composite solids including inverse situations.</li> </ul>	A Draws a diagram to represent information extracted from a multi-step word problem. Solves problems by applying the appropriate surface area and volume formulas for objects, including inverse use of formulas and rates.	Chapter 3	Chapter 6		Week 6 Test 1 Number and Algebra Ch1,2,& 7 6.25%
	B Draws a diagram to represent information extracted from a word problem. Solves problems involving composite solids by applying the appropriate surface area and volume formulas.				
	C Uses the appropriate formulas to calculate the surface area and volume of objects comprising of prisms.				
Weeks 8-10 Geometric Reasoning <ul style="list-style-type: none"> <li>Formulate proofs for congruent triangles and angle properties</li> <li>Prove and apply angle and chord properties of a circle.</li> <li>Uses congruence and similarity in applying logical reasoning to a variety of problems involving plane figures.</li> </ul>	A Justifies similarity of triangles after drawing a diagram to represent a familiar two-dimensional situation, such as trees and shadows, and applies ratios to deduce the unknown. Draws a diagram for given information, proves congruency or similarity and deduces further properties of geometric figures	Chapter 17	Chapter 2		EPW 1 10%
	Justifies similarity of triangles after drawing a diagram to represent a familiar two-dimensional situation, such as trees and shadows, and deduces the unknown. Draws a diagram for given information, proves congruency or similarity and deduces further properties of				
	B Draws a diagram to represent a familiar two-dimensional situation, such as trees and shadows, and applies ratios to deduce the unknown. Draws a diagram for given information and proves congruency or similarity of triangles.				
	C Uses angle and triangle properties to prove congruency or similarity of triangles using given diagrams. Applies ratios and geometric reasoning to deduce missing values in given diagrams.				

<p><b>TERM 2</b>  <b>Week 1-3</b>  Indices, Logs and Surds</p> <ul style="list-style-type: none"> <li>Revise index laws using rational number indices</li> <li>Consolidate scientific notation</li> <li>Define rational and irrational numbers and perform the four operations with surds and fractional indices.</li> <li>Define and use laws of logarithms</li> <li>Simplify log expressions</li> <li>Investigate the connection between logarithms and exponentials.</li> </ul>	<p>A  Applies index laws to simplify complex algebraic products and quotients involving integral indices. No information and using surds and logs</p> <p>B  Applies index laws to simplify complex algebraic products and quotients involving integral indices. No information and using surds and logs</p> <p>C  Applies index laws to simplify algebraic products and quotients involving non-negative integral indices. No information and using surds and logs</p>	Chapter 4	Chapter 3 & 10A,10B and 10C		Test 2 Week 2 Term 2 Ch 3 & 17 Measurement and Geometry 6.25%
<p><b>Weeks 3-5</b>  <b>Finance</b></p> <ul style="list-style-type: none"> <li>Revise simple interest including inverse calculations</li> <li>Investigate compound interest and its applications to depreciation, inflation and reducible loans.</li> <li>Calculating compound interest over different compounding intervals.</li> </ul>	<p>A  Extracts relevant information from word problems and applies repeated interest calculations for the comparison of loans and investments. Provides valid justification for the recommendations made. Uses inverse calculations to solve for the rate with compound interest, showing full working.</p> <p>B  Extracts multiple pieces of information from text and tables to make ongoing interest calculations for loans and investments. Uses inverse calculations to solve for the principal in compound interest</p> <p>C  Applies formulas for simple and compound interest. Identifies compound interest as repeated applications of simple interest.</p>	Chapter 11	Chapter 3		
Week 6	<b>Semester 1 Examination 1</b>				All Term 1 & 2 content with largest proportion on weeks 1 -5 of term 2. Weighting 12.5%
<p><b>Weeks 7– 10</b>  <b>Quadratics</b></p> <ul style="list-style-type: none"> <li>Expanding binomials</li> <li>Factorising quadratics by common factors, difference of squares, factorise monic and non-monic quadratics.</li> <li>Completing the square</li> <li>Solving a variety of quadratic equations using factorisation and quadratic formula.</li> <li>Expanding and solving polynomial equations with the use of remainder and factor theorems.</li> </ul>	<p>A  Expands and simplifies the sums and differences of binomial expressions involving fractions. Applies factorisation multiple times to expressions including non-monic quadratic trinomials. Applies multi-step factorisation, at least three times, to simplify products and quotients of algebraic fractions. Formulates a quadratic equation by extracting relevant information from a complex word problem. Rearranges the equation into a form for ease of computation and solves it through a variety of techniques, including graphical. Applies the quadratic formula, showing full working, to obtain the simplified irrational solution/s.</p> <p>B  Expands and simplifies the sums and differences of binomial expressions. Factorises two-step algebraic expressions involving common factors, quadratic binomials and monic trinomials. Applies one-step factorisation to simplify algebraic products and quotients. Solves a quadratic equation algebraically and justifies the solution/s using a variety of techniques.</p> <p>C  Expands and simplifies, where necessary, binomial expressions. Factorises monic quadratic expressions such as common factors, binomials, trinomials and quadnomials. Solves a simple quadratic equation algebraically and links the solution to the - intercepts on the matching graph. Applies the four operations to simple algebraic fractions. Simplifies algebraic fractions expressed in factored form.</p>	Chapter 6,7 & 9	Chapter 5 & 10D, 10E, 10F,10G,10H		EPW 2 10%

<p><b>TERM 3</b> Week 1-3 <b>Graphs</b></p> <ul style="list-style-type: none"> <li>Polynomials and their features upto cubics and their transformations</li> <li>Solve and graph simple exponential equations</li> <li>Describe, graph and interpret simple hyperbolas and circles including transformations.</li> <li>Applications to mathematical modelling eg growth and decay.</li> </ul>	<p><b>A</b> Makes connections between transformed relations and writes the rule for the given graph.</p> <p><b>B</b> Makes connections between the algebraic and graphical forms of quadratic, circular and exponential relations, distinguishing between rules for relations of the same kind. Sketches relations, applying transformations.</p> <p><b>C</b> Makes connections between the algebraic and graphical representations of relations such as quadratic, circular and exponential.</p>	Chapter 14&16	Chapter 7 & 10I		
<p>Week 4-6 <b>Chance</b></p> <ul style="list-style-type: none"> <li>Use tree diagrams, arrays, two-way tables, Venn diagrams to describe two and three step experiments.</li> <li>Examine contexts of dependence, independence, complementary and conditional probabilities.</li> <li>Use probability vocabulary and notation in word problems.</li> </ul>	<p><b>A</b> Lists outcomes for multi-step chance experiments, with and without replacement, including the use of probability trees, assigns probabilities to the outcomes and determines probabilities of compound events, with conditions. Identifies events that are independent.</p> <p><b>B</b> Lists outcomes for multi-step chance experiments, with and without replacement, assigns probabilities to the outcomes and determines probabilities of compound events. Draws two-way tables and Venn diagrams, and determines probabilities of compound events.</p> <p><b>C</b> Lists outcomes for multi-step chance experiments and assigns probabilities.</p>	Chapter 8	Chapter 8		<p>Test 3 Term 3 Week 2 Number and Algebra 6,7,9 ,14 &amp; 16</p> <p>Weighting 6.25%</p>
<p>Week 6-7 <b>Trigonometry 1</b></p> <ul style="list-style-type: none"> <li>Solve right-angled triangle problems including those involving direction and angles of elevation and depression.</li> <li>Apply Pythagoras Theorem and trigonometry to problems involving surveying and design.</li> </ul>	<p><b>A</b> Chooses to use algebra in solving a problem requiring the use of Pythagoras' Theorem to find the missing lengths of the side/s. Diagrammatically represents a complex word problem, including the application of direction and elevation. Follows multiple steps to solve the problem, e.g. applies rates, Pythagoras' Theorem and trigonometry.</p> <p><b>B</b> Diagrammatically represents a word problem involving elevations. Follows multiple steps to solve the problem, e.g. applies Pythagoras' Theorem and trigonometry.</p> <p><b>C</b> Uses trigonometric ratios to find unknown sides in right-angled triangles. Selects and uses the correct trigonometric ratio to calculate unknown angles.</p>	Chapter 12	Chapter 4		

<p>Weeks 8-10 Trigonometry 2</p> <ul style="list-style-type: none"> <li>Establish area, sine and cosine rules for any triangle and use them along with Pythagorean theorem to solve problems in surveying, navigation, design and 3-D.</li> <li>Use the unit circle to define trigonometric functions and graph them with and without technology.</li> <li>Analyse the periodic and symmetric nature of trigonometric functions.</li> <li>Solve simple trigonometric equations.</li> </ul>	<p>A Chooses to use algebra in solving a problem requiring the use of Pythagoras' Theorem to find the missing lengths of the side/s. Diagrammatically represents a complex word problem, including the application of direction and elevation. Follows multiple steps to solve the problem, e.g. applies rates, Pythagoras' Theorem and trigonometry.</p> <p>This content is at extension so any successful completion should be graded at A or B only.</p>	Chapter 19	Chapter 4		<p>Test 4 Chance Ch 8 M &amp; G Ch 12Trig 1</p> <p>Weighting 6.25%</p>
<p><b>Term 4</b> Weeks 1-3 Coordinate Geometry</p> <ul style="list-style-type: none"> <li>Review finding gradients, intercepts, equations of lines, mid-points and length of lines.</li> <li>Looking at relationships for parallel and perpendicular lines.</li> <li>Solve problems involving parallel and perpendicular relationships.</li> </ul>	<p>A Rearranges linear rules given in a variety of forms to justify the presence, or not, of a geometric relationship. Solves problems involving perpendicular lines.</p> <p>B Rearranges linear rules into forms to make conclusions about the geometric relationship. Solves problems involving parallel lines.</p> <p>C Identifies the relationship between lines as being parallel or perpendicular by referring to the gradients.</p>	Chapter 16	Pages 25 – 55		
<p>Weeks 3 – 5 Staistics 1 &amp; 2</p> <ul style="list-style-type: none"> <li>Evaluate appropriateness of sampling methods in reports that reflect populations, analyse misleading graphs and types of sampling.</li> <li>Construct boxplots and use in conjunction with parallel boxplots and/or histograms and/or dot plots to summarise data and make comparisons between data sets.</li> <li>Use standard deviation and mean to summarise data and compare data sets.</li> <li>Use scatter graphs and line of best fit to analyse and describe bivariate data.</li> <li>Use technology in statistical calculations and to analyses appropriateness and statistical modelling of data, including time series.</li> </ul> <p>NB: Where possible use actual reports.</p>	<p>A Matches box plots to corresponding histograms and dot plots, and provides an explanation using concise statistical reasoning. Applies algebraic techniques to calculate the equation of the trend line for bivariate and time-series data. Uses the equation to make predictions, identifying factors that influence the reliability of predictions and gives reasons why predictions and actual values may vary. Uses explicit statistical language when writing statistical reports, making links/references to resources relevant to the report.</p> <p>B Uses the quartiles, together with minimum, median and maximum data values, to draw box plots of data from primary and secondary sources, identifying possible outliers. Compares data presented on parallel box plots, using correct statistical language. Investigates and describes relationships between variables for bivariate and time-series data relating to economic, social and environmental issues. Draws trend lines, comments on predictions and gives possible reasons why predictions and actual values may vary.</p> <p>C Calculates quartiles and interquartile range for collected or given authentic data. Compares data sets by referring to the shape of the display. Describes the trend and patterns for bivariate data where the independent variable is time. Describes the statistical relationship between two continuous variables. Evaluates statistical reports.</p>	Chapter 8, 13 & 18			
<p><b>Week 6</b></p>	<p><b>Semester 2 Examination</b></p>				<p>Content on T2 week 8 to T4 week 5 with emphasis on last 5 weeks. Weighting 12.5%</p>
<p><b>Week 7 – 10</b> Consolidation of course preparation for Year 11 courses and OLNA. Where needed.</p>					

