Year 10 Extension Mathematics

Recommendation

A High Achievement (B) in Year 9 Mathematics. An interview with the Mathematics teacher can be arranged to determine a student's ability to undertake Extension Mathematics.

Achievement

By the end of Year 10, students recognize 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 recognize 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. Students expand binomial expressions and factories 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.

Assessment Criteria

Using the marking guide provided, an overall level of achievement in this subject is determined by the teacher's judgment of the evidence presented in students' summative assessment. All assessment unless noted on task sheet completed by Math's student's assess the following criteria:

- Understanding and fluency
- Problem-solving and reasoning

Delivery (mode, time requirements, lessons)

Students have access to a one hour scheduled lesson and a one hour tutorial each week. Lessons are delivered via Collaborate Ultra. Students are also expected to undertake independent study to complete tasks and assessment in accordance with the Work Rate Calendar. Course materials can be accessed in the learning management system.

Student Requirements

Computer, access to internet, email, printer, scanner, telephone or headset with microphone, audio visual software/devices, scientific calculator, exercise book, stationery.

Year 10 Extension Mathematics (Semester 1)

Units and Learning Experiences, Summative Assessment, Criteria Assessed, Approximate timing/due date of Summative Assessment		
Semester 1	**Term 1**	**Unit 1** **Pythagoras and Trigonometry** Revise Pythagoras' Theorem and solve contextualised problems, apply the trigonometric ratios to solve problems, by substitute into formulas, in two and three dimensions and solve contextualised trigonometric problems including surveying and orienteering **Pythagoras and Trigonometry** Solve problems involving Pythagoras' Theorem in 3-D, the sine, cosine and area rules, the unit circle, trigonometric functions and periodicity. **Chance** Describe the results of two- and three-step chance experiments, assign and determine probabilities including conditional probability and investigate the concepts of dependence and independence; evaluate media statements and statistical reports.
		Summative Assessment, due date: • Short answer questions (Week 9)
	Term 2	**Unit 2** **Linear and non-linear relationships** Explore connections between algebraic and graphical representations, make generalisations in relation to parallel and perpendicular lines, identify the solution to two intersecting linear equations, apply graphical and substitution methods to find solutions and solve contextualised problems. **Patterns and algebra** Apply the four operations to algebraic fractions, manipulate expressions & equations to solve problems involving algebraic fractions, formulate & solve problems involving algebraic fractions, expand and factorise quadratics **Linear and non-linear relationships** Formulate & solve monic quadratic equation problems, represent relations & their transformations accurately & extend application of graphing from linear functions to parabolas, circles and exponential functions. **Patterns and algebra** Expand and factorise non-monic quadratics, solve quadratic equations **Linear and non-linear relationships** Connect functions & their transformations, graph parabolas, circles & exponential functions, apply the index laws to involve irrational numbers.
		Summative Assessment, due date: • Short answer questions (Week 10)

Year 10 Extension Mathematics (Semester 2)

Units and Learning Experiences, Summative Assessment, Criteria Assessed, Approximate timing/due date of Summative Assessment		
Semester 2	**Term 3**	**Unit 3** **Data representation and interpretation** Develop an understanding of statistical measures, recall and apply knowledge of measures of centre and spread, investigate and describe data sets effectively, analyse data displays (box plots, histograms and scatter plots), make connections - statistical measures and data displays. **Data representation and interpretation** Compare data sets using standard deviation, make predictions using a line of best fit. **Using units of measurement** Recall formulas to calculate area and volume, calculate the surface area and volume of prisms and cylinders, solve problems - calculating surface area and volume of composite solids **Geometric reasoning** Recall angle relationships for straight lines, triangles and quadrilaterals, prove angle relationships using formal proofs, congruency and similarity rules and apply understanding of plane shapes to prove geometric properties. **Using units of measurement** Extend measurement calculations to pyramids, cones and spheres **Geometric reasoning** Apply proofs to circles **Linear and non-linear relationships** Sketch and describe hyperbolas.
		Summative Assessment, criteria assessed, approximate timing/due date: • Short answer questions (Week 10)
	Term 4	**Unit 4** **Money and financial mathematics** Recall simple and compound interest formulas, calculate simple and compound interest, connect simple and compound interest, substitute into a formula, connect graphical and algebraic representations of functions, solve financial problems involving compound interest and loans. **Real numbers** Define a logarithm, make connections between exponential and logarithmic expressions, establish and apply the laws of logarithms, simplify expressions using logarithmic laws and solve financial problems involving the use of logarithms. **Linear and non-linear relationships** Represent and solve problems involving simple linear equations, represent and solve problems involving simple linear inequalities and solve simultaneous equations graphically. **Linear and non-linear relationships** Features of a polynomial, connect a written division algorithm and the factor and remainder theorems and sketch polynomials.
		Summative Assessment, criteria assessed, approximate timing/due date: • Short answer questions (Week 6)

Disclaimer   All of the above information is accurate at the time of development.