Year 13 Mathematics (Applications & Interpretations) SL

Learning Standards

Unit title/ statement of inquiry	Knowledge Content Students are expected to know the following...	Concepts	Curricular Competencies Students are expected to do the following...
Unit 5: Quantifying uncertainty Probability enables us to quantify the likelihood of events occurring and so evaluate risk. Both statistics and probability provide important representations which enable us to make predictions, valid comparisons and informed decisions. These fields have power and limitations and should be applied with care and critically questioned, in detail, to differentiate between the theoretical and the empirical/observed. Probability theory allows us to make informed choices, to evaluate risk and to make predictions about seemingly random events.	● Concepts of trial, outcome, relative frequency, sample space and event ● Complementary events and expected number of occurrences ● Use of Venn diagrams, tree diagrams, sample space diagrams and tables ● Mutually exclusive events, conditional probability, independent events ● Concept of discrete random variables and their probability distributions. ● Binomial distribution ● Mean and variance of the binomial distribution ● The normal distribution and its properties ● Inverse normal probability calculations, standardization of normal variables	Quantity Validity Approximation Modelling Relationships Patterns	**Knowledge and understanding:** ● Recall, select and use their knowledge of mathematical facts, concepts and techniques in a variety of familiar and unfamiliar contexts **Problem solving:** ● Recall, select and use their knowledge of mathematical skills, results and models in both abstract and real-world contexts to solve problems **Communication and interpretation**: ● Transform common realistic contexts into mathematics; comment on the context; sketch or draw mathematical diagrams, graphs or constructions both on paper and using technology; record methods, solutions and conclusions using standardized notation; use appropriate notation and terminology **Technology:** ● Use technology accurately, appropriately and efficiently both to explore new ideas and to solve problems **Reasoning:** ● Construct mathematical arguments through use of precise statements, logical deduction and inference and by the manipulation of mathematical expressions **Inquiry approaches:** ● Investigate unfamiliar situations, both abstract and from the real world, involving organizing and analyzing information, making conjectures, drawing conclusions, and testing their validity
Unit 6: Rates of change and approximating irregular space Calculus describes rates of change between two variables and the accumulation of limiting areas. Understanding these rates of change allows us to model, interpret and analyze real-world problems and situations. Calculus helps us understand the behaviour of functions and allows us to interpret the features of their graphs.	● Introduction to the concept of a limit ● Derivative interpreted as gradient function and as rate of change ● Increasing and decreasing functions ● Derivative of functions of the polynomial form ● Tangents and normals at a given point, and their equations ● Integration as anti-differentiation ● Anti-differentiation with a boundary condition to determine the constant term ● Area of a region enclosed by a curve and the x -axis ● Local maximum and minimum points ● Optimisation problems in context ● Definite and indefinite integrals ● Definite integrals using technology ● Approximating areas using the trapezoidal rule	Change Patterns Relationships Approximation Space Generalization	