

Module 2: Statistics and probability

The student is able to organise, summarise, analyse and interpret data to identify, formulate and test statistical and probability models, and solve related problems.

	Grade 10		Grade 11		Grade 12
	We know this when the student is able to:		We know this when the student is able to:		We know this when the student is able to:
10.2.1	(a) Use Venn diagrams as an aid to solving probability problems of random events. (b) Use Tree diagrams as an aid to solving probability problems of random events. (c) Use contingency tables to solve probability problems. (d) Recognise and then determine the probability of conditional events using diagrams and the formula: $P(A B) = \frac{P(A \cap B)}{P(B)}$ (e) Identify and determine the probability of mutually exclusive and independent events. (f) Use the Laws of Probability to evaluate simple random events.	11.2.1	(a) Identify, apply and calculate the probability of the following distributions of discrete random events: • Hypergeometric distribution model • Binomial distribution model The mean and variance of the binomial distribution should be known and applied. (b) Formulate and/or apply a probability mass function (including simple continuous models) and find the expected value and variance. (c) Identify and apply the Normal distribution model to the probability of continuous random events, using statistical tables and calculations as necessary.	12.2.1	(a) Understand how the Central Limit Theorem is applied when a large ($n > 30$) sample is taken from any distribution. (b) Apply the Normal distribution model to a sample to estimate a confidence interval for the population mean or proportion, using statistical tables to deal with various confidence levels. (c) Apply the normal approximation to the binomial distribution, utilising continuity corrections, as appropriate. (d) Formulate a probability mass or density function for a: • Hypergeometric distribution • Binomial distribution • Simple continuous probability models

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	We know this when the student is able to:		We know this when the student is able to:		We know this when the student is able to:
10.2.2	Count arrangements using permutations (including those where repetition occurs).	11.2.2	Count arrangements and choices using permutations (including those where repetition occurs) and combinations.	12.2.2	–
10.2.3	(a) Calculate the standard deviation. (b) Understand the mean and standard deviation of a population as applied to the normal distribution. The effect of these parameters on the shape of the curve should be understood. (c) The percentage of values that lie within 1, 2 and 3 standard deviations of the mean should be known.	11.2.3		12.2.3	Perform a one-tail and/or two-tail hypothesis test on a mean or difference of means. This includes being able to: - Distinguish between one-tail and two-tail events. - Establish a null hypothesis based on the prevalent condition.