

## Learning Outcomes – MATH 10041 – Chapter 5

<b>Ch.</b>	<b>Sec.</b>	<b>Big idea</b>	<b>Learning outcomes – Conceptual</b>	<b>Learning Outcomes - Observable</b>
5	1	Randomness; Probability	<p>Understanding that true randomness is difficult to achieve without a computer or other randomizing device;</p> <p>Understand that probability is a tool used to measure how often random events occur;</p> <p>Understand the differences between theoretical and empirical probabilities and the need for both;</p> <p>Understand the purpose of doing a simulation.</p>	<p>Give an accurate definition of randomness as used in statistics;</p> <p>Describe probability as a relative frequency;</p> <p>Define the terms <b>theoretical</b> and <b>empirical</b> probability;</p> <p>Given a description of a probability, determine whether it is an empirical or theoretical probability;</p> <p>Explain what a simulation is and why we conduct them.</p>
	2	Finding theoretical probabilities	<p>Understand the rationale behind each of the probability rules used in the section;</p> <p>Understand the following terms: complement of a set, sample space, event, equally likely, mutually exclusive;</p> <p>Understand the use of the words AND and OR in the mathematical sense.</p>	<p>Compute and interpret an appropriate probability to answer a probability question, make decisions, and justify conclusions;</p> <p>Write the sample space for a given probability experiment;</p> <p>Compute and interpret the probability of the union of two events in the context of a two-way table;</p> <p>Compute and interpret the probability of the intersection of two events in the context of a two-way table;</p> <p>Determine if two given events of a sample space are mutually exclusive.</p>
	3	Conditional probabilities; Independent events	<p>Understand conditional probability and when it should be used;</p> <p>Understand the difference between mutually exclusive and independent events.</p>	<p>Recognize a situation requiring the use of a conditional probability;</p> <p>Translate into probability symbols a situation requiring the use of conditional probability;</p> <p>Compute and interpret the probability of conditional events in the context of a two-way table;</p> <p>Compute and interpret the probability of conditional events by using Probability Rule 5a;</p> <p>Explain what it means for two events to be independent;</p> <p>Given a sample space and several events, determine if the events are mutually exclusive, independent, or associated;</p> <p>Recognize when to use the multiplication rule for independent events;</p> <p>Appropriately use the multiplication rule for a sequence of independent events;</p> <p>Appropriately use the general multiplication rule of a sequence of associated events.</p>
	4	Simulations and estimating probabilities	Understand the Law of Large Numbers.	<p>Recognize faulty reasoning (a misinterpretation of the Law of Large Numbers) in predicting outcomes of a probability experiment;</p> <p>Know the number of trials recommended for a simulation to give an accurate estimate of a theoretical probability.</p>