Learning Outcomes – MATH 10041 – Chapter 7

Ch.	***Sec.***	***Big idea***	***Learning outcomes – Conceptual***	***Learning Outcomes - Observable***
7	1	Surveys as a means of learning about the world	Understand the vocabulary of sampling: **census, sample, statistics vs parameters, estimator, estimates, inference, bias in surveys, sampling bias, measurement bias, convenience sample, simple random sample, sampling without replacement**; Understand the notation used in sampling;	Explain the difference between a statistic and a parameter; Recognize sampling performed with and without replacement. Recognize bias in a sampling scenario; Recognize the type of bias, measurement or sampling (convenience, non-response), given a sampling scenario; Appropriately use μ and $\bar{x}$ in context; Use a random number table to randomly select a sample.
	2	Sampling Distributions	Understand bias and precision of an estimator; A population parameter is fixed, but sample statistics vary from sample to sample; Larger random samples are more likely to be representative of the population than smaller ones; There are three levels of data involved in taking random samples: the population, the individual samples, and the distribution of sample statistics; Sample statistics can be graphed and summarized in a distribution, just as raw data may be graphed and summarized; Understand the effect of sample size on the S.E.	Explain the difference between bias and precision of an estimator; Explain how bias and precision of an estimator are measured; Determine the bias and precision of a given estimator; Write a definition of standard error; Determine the standard error of a sampling distribution and interpret it in context; Determine, by looking at several dotplots of data, which had the largest or smallest sample size.
	3	Central Limit Theorem for Sample Proportions	Although sample statistics vary from the population parameter, they vary in a predictable way; Understand when and why a sampling distribution looks bell-shaped; Understand how the Central Limit Theorem describes the shape, center, and spread of sampling distributions of sample statistics.	Generate sampling distributions to observe, empirically, the Central Limit Theorem; Determine the mean and standard deviation of a sampling distribution; Recognize situations in which the CLT does/does not apply; Use the Central Limit Theorem in approximating distributions of sample proportions; Use the CLT to approximate the probability of a proportion in a sample.
	4	Estimating population proportions with confidence intervals	Understand that a confidence interval is an estimate of a parameter, with a margin of error; Understand what the 95% refers to in a confidence interval; Understand that the use of confidence intervals depends on assumptions being met.	Recognize situations in which the CLT applies and a confidence interval is appropriate; Recognize situations where a confidence interval is not needed (i.e. know the parameter); Construct a confidence interval for a population proportion; Interpret a confidence interval for a population proportion; Evaluate the validity of claims using a confidence interval; Correctly state the meaning of 95% while interpreting a confidence interval.