Learning Outcomes – MATH 10041 – Chapter 8

Ch.	Sec.	Big idea	Learning outcomes – Conceptual	Learning Outcomes - Observable
8	1	Essential Ingredients of hypothesis testing	Understand hypothesis testing as making an argument; Significance level as the probability of rejecting a true null hypothesis; Understand that p-value is the probability of obtaining the data if the null hypothesis were true.	Given a research question, formulate null and alternative hypotheses; Explain the meaning of significance level in context; Explain the meaning of *p*-value in context; Know the formula for the test statistic (*z*) and calculate it by hand.
	2	Hypothesis testing in four steps	Understand the logic and framework of the inference of hypothesis testing.	Verify the conditions for a hypothesis test; Given a research question, conduct a hypothesis test for a population proportion; Make a decision using *p*-value and draw an appropriate conclusion; Relate a "Type I" error and level of significance for a hypothesis test when making a decision; Recognize areas on the standard normal curve that could represent a p-value.
	3	Hypothesis tests in detail	Statistical vs practical significance; What to do if conditions fail; Types of errors; Inappropriate conclusions and manipulations during hypothesis testing.	Relate Type I error and statistical significance; Use appropriate language when interpreting the results of a hypothesis test; Interpret statistical and practical significance; Interpret a Type I error and a Type II error in context; Be able to compare relative sizes of the test-statistic and *p*-value. For example, answer such questions as, "*If the z-statistic is close to 0, would the p-value be large or small?* Detect flaws in a faulty hypothesis test (e.g. inappropriate conclusions or changing the hypotheses to fit the data); Choose the better inference technique, a confidence interval or hypothesis test, given a research question.