Practice Assignment: P-Value

1) Given a test statistic of $z = 2.12$, go to https://lumen-learning.shinyapps.io/normaldist/ to calculate the P-value for a test with hypotheses:

$$H_0: p = 0.23 H_A: p < 0.23$$

2) Given a test statistic of $z = 2.12$, go to https://lumen-learning.shinyapps.io/normaldist/ to calculate the P-value for a test with hypotheses:

$$H_0: p = 0.23 H_A: p > 0.23$$

3) Given a test statistic of $z = 2.12$, go to https://lumen-learning.shinyapps.io/normaldist/ to calculate the P-value for a test with hypotheses:

$$H_0: p = 0.23 H_A: p \neq 0.23$$

4) Consider your answers to Questions 1–3. Which P-values seem to be the most convincing in terms of indicating that the null hypothesis is not true? Explain.

5) Consider your answers to Questions 1 and 2. What is the relationship between these values? Why does this relationship exist?

6) Consider your answers to Questions 2 and 3. What is the relationship between these values? Why does this relationship exist?

Questions 7–9: Decide whether there is enough evidence to reject the null hypothesis at a 5% significance level and complete the following table.

[Continued on the next page.]

	P-value	Reject or Do not reject the null hypothesis
7)	0.01	
8)	0.11	
9)	0.50	

10) Determine whether this statement is true or false: A small P-value suggests strong evidence against the null hypothesis in favor of the alternative hypothesis.

11) Determine whether this statement is true or false: The direction of the alternative hypothesis has no effect on the P-value.

12) Determine whether this statement is true or false: The significance level of a test does not affect the decision that is made regarding the null hypothesis.

13) It is estimated that approximately 64% of Americans are daily coffee drinkers. A researcher conducts a study to determine whether a higher percentage of college students drink coffee.

Part A: What is the null hypothesis?

Part B: What is the alternative hypothesis?

Part C: In a random sample of 250 college students, 178 drink coffee daily. Given this, check the conditions for conducting a one-sample z-test for proportions.

Conditions for One-Sample Z-Test for Proportions

1. **Large Counts:** Check that 10 and 10.
2. **Random Samples/Assignment:** Check that the samples are random samples.
3. **10% Population Size:** Check that the sample size, , is less than 10% of the population size, : 0.10.

Part D: Calculate the value of the test statistic.

Part E: Using the data analysis tool at https://lumen-learning.shinyapps.io/normaldist/, calculate the P-value.

Part F: Based on this P-value, do you think the corresponding test statistic seems unusual?

Part G: At a 5% significance level, can we “reject the null hypothesis?”

Part H: Does the researcher have convincing evidence that a higher percentage of college students drink coffee?

