Assignment 3

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### 1. Come up with a mean from economics that you’d like to know more about (example: male to female wage gap). State your best guess for the null hypothesis.

The mean energy use for a metro-Atlanta area consumer did not increase by 5% last year. ### 2. State the alternative hypothesis in 3 different ways. $H\_a: \_y < 0.05 $

### 3. Can you accept your alternative hypothesis? Why or why not?

Because are testing for and even if we do accept the null hypothesis, it is understood that it does not make it true and could be later rejected

### 4. You randomly draw a large sample of your desired mean and find that the sample mean is 2 times as large as you expected and suppose we know that the standard deviation is 3 times the expected mean. What is the probability that your expectation about the mean is correct?

### 5. What is your intuition for why dividing the difference between your sample and expected average by the standard deviation gives you a good approximation for how likely something is to occur?

it’s taking the residual difference between the sample and expected and dividing out the spread of

the probability of observing a value at least as different so we find the difference between what is observed and expected divided by how far observations are spread

### 6. Describe the distinction between standard error and the standard deviation, and when can we use the standard error?

The standard deviation describes how individual observations vary from the mean whereas the standard error is a measure of how the sample mean varies from the expected mean

### 7. Suppose your sample size from 4 was 100. What is the 95% confidence interval for your sample in 4? Describe what this confidence interval tells you.

That 95% of the time with multiple samples, the values of the true population mean would fall within this interval

### 8.Define the standard error in a comparison of a two-means sample group.

### 9. What happens to the standard error if one group remains small but the other grows large? Does it converge towards zero still?

### 10. Define some differences that you’d like to know more about in economics.

### 11. How would you collect the sample to find the smallest standard error while holding the overall sample size constant?

### 12. Why do you think a null hypothesis that the differences between two means is 0 is the most widely used hypothesis in science?

### 13. A scatterplot is a plot that shows what?

### 14. Draw a fictional scatterplot that relates earnings to years of education.

### 15. What does correlation measure in a scatterplot in linear samples? Is it the slope of the line?

### 16. What will be the correlation coefficient of a variable that is quadratic over its sample?