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Week 7 Reading Questions

I did not work on these questions with anyone

- **Q1 (1 pt.):** Explain the effect, if any, of the population mean on the width of CIs for a population that is normally-distributed. If population mean does not affect the widths of CIs explain why not.

The population mean does not affect the width of CIs for a population with a normal distribution. A change in population mean might change the position of the sample mean, but would not affect the width, as the population mean would always fall within the confidence interval based off the recorded sample mean.

- **Q2 (1 pt.):** Explain the effect, if any, of the population standard deviation on the width of CIs. If population standard deviation does not affect the widths of CIs explain why not.

The population standard deviation does affect the width of the CIs. The width of the confidence interval would increase with standard deviation to account for more variance from the population mean.

- **Q3 (1 pt.):** Explain the effect, if any, of the *population size* on the width of CIs. If *population size* does not affect the widths of CIs explain why not.

The population size would not affect the width of the CIs. The population size is always the population size, and it's not something that will be changed by different sampling methods, so it's not going to widen or shrink the confidence interval.

- **Q4 (1 pt.):** Explain the effect, if any, of the *sample size* on the width of CIs. If *sample size* does not affect the widths of CIs explain why not.

The sample size, however, will affect the width of the CIs. The greater your sample size, typically, the smaller your confidence interval, as you increase the precision of your results by ensuring that your findings more accurately reflect the population as a whole.

- **Q5 (4 pts.):** Interpreting a CI. Use a narrative example of a real (or made up) dataset to describe what a Frequentist 95% confidence interval really means.
 - Make sure you cover any relevant assumptions of the Frequentist paradigm.
 - Your answer must be in non-technical language.
 - Imagine you were explaining confidence intervals to an audience of teenagers, or perhaps a family member who doesn't have training in statistics.

A Frequentist 95% confidence interval does not mean a 95% chance of finding the correct population mean, or of getting the same sample mean on repeat samples. For instance, if you are looking at a population of squirrels in a particular forest and you are trying to determine the mean age of the squirrels in the forest, you go out and take random samples of the population and build a model that

determines the sample mean to be 3.08 years old. If you have a 95% Frequentist confidence interval, that doesn't mean you are 95% sure the mean squirrel age in the forest is 3.08 years old for the entire population. That means that if you were to go out and repeat your sampling multiple times in the sample forest, you would expect that 95% of the time, the intervals you construct with your model would contain the true population mean, the actual mean age for the entire population. You still don't know the true mean age of squirrels in this forest, but 95% of the models built through the same sampling method would contain the true mean in the confidence interval built around your sample mean of 3.08 years old. Additionally, there is not a 95% chance of your initial sample mean being included in subsequent samples. That would only be the case if your sample mean for the first trial happened to be exactly the population mean.