

SOC 4930/5050: Lab-06 - Foundations for Inference

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Directions

Please complete all steps below. Your your work “by hand” as well as your well-formatted R Notebook source (the .Rmd file) and html output should be uploaded to your GitHub assignment repository by 4:15pm on Monday, October 9nd, 2017.

Use the following scenario: You are working with census data of Saint Louis University students. Assume that these data are a complete representation of the student body and this represent a *population*. The student body average grade percentage is a 90 with a standard deviation of 10.

Part 1: Sampling Distributions

1. Assume you draw repeated random samples of $n=500$ students. What is the standard error of these repeated samples?
2. Assume you draw repeated random samples of $n=1000$ students. What is the standard error of these repeated samples?
3. If you were to draw repeated random samples of $n=500$ students, what proportion of these samples will have sample means greater-than or equal to 95?
4. If you were to draw repeated random samples of $n=500$ students, what proportion of these samples will have sample means less-than or equal to 80?
5. What sample size would we need to have a sample mean that is within 1 percentage point of the population's?
6. What sample size would we need to have a sample mean that is within 3 percentage points of the population's?
7. What sample size would we need to have a sample mean that is within 5 percentage points of the population's?

Part 2: Predictive Intervals

8. Calculate and interpret a 95% predictive interval for x .
9. Calculate and interpret a 99.9% predictive interval for x .
10. Calculate and interpret a 95% predictive interval for \bar{x} with a random sample of $n=500$ students.
11. Calculate and interpret a 99% predictive interval for \bar{x} with a random sample of $n=500$ students.

Part 3: Confidence Intervals

12. Calculate and interpret a 95% confidence interval assuming we draw a random sample of $n=500$ students.
13. Calculate and interpret a 99% confidence interval assuming we draw a random sample of $n=500$ students.
14. Calculate and interpret a 95% confidence interval assuming we draw a random sample of $n=1000$ students.
15. Calculate and interpret a 99% confidence interval assuming we draw a random sample of $n=1000$ students.