# *SOC 4930/5050: PS-05 - 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:** CDC data suggests that the population average cholesterol level is 196. Assume that this distribution has a standard deviation of 20.

## *Part 1: Sampling Distributions*

1. Assume you draw repeated random samples of $n$=1250 students. What is the standard error of these repeated samples?
2. If you were to draw repeated random samples of $n$=1250 students, what proportion of these samples will have sample means greater-than or equal to 225?
3. What sample size would we need to have a sample mean that is within 10 points of the population's?

## *Part 2: Predictive Intervals*

4. Calculate and interpret a 95% predictive interval for $x$.
5. Calculate and interpret a 99% predictive interval for $x$.
6. Calculate and interpret a 95% predictive interval for $\bar{x}$.
7. Calculate and interpret a 99.9% predictive interval for $\bar{x}$.

## *Part 3: Confidence Intervals*

8. Calculate and interpret a 95% confidence interval assuming we draw a random sample of $n$=1000 students.

9. Calculate and interpret a 99.9% confidence interval assuming we draw a random sample of $n$=1000 students.
10. Calculate and interpret a 95% confidence interval assuming we draw a random sample of $n$=1500 students.
11. Calculate and interpret a 99% confidence interval assuming we draw a random sample of $n$=1500 students.

*Rubric*

Individual Questions

| Part 1 | | Part 2 | | Part 3 | |
|---|---|---|---|---|---|
| Question | Points | Question | Points | Question | Points |
| 1 through 3 | 2 | 4 through 7 | 2 | 8 through 11 | 2 |
| *Points Possible* | 6 | | 8 | | 8 |

*Note:* Partial credit possible

Notebook Formatting & RMarkdown

| Category | Details | Points |
|---|---|---|
| Excellent | Syntax used appropriately & without error | 4 |
| Good | Minor concerns with syntax use | 2.5 |
| Improvement Needed | Significant concerns with syntax | 1 |
| Unsatisfactory | No RMarkdown used | 0 |
| *Points Possible* | | 4 |

Literate Programming

| Category | Details | Points |
|---|---|---|
| Excellent | Narrative throughout with great detail | 4 |
| Good | Some narrative with inconsistent detail | 2.5 |
| Improvement Needed | Limited narrative with little detail | 1 |
| Unsatisfactory | No narrative included | 0 |
| *Points Possible* | | 4 |