

I. **Sections to Read** (All content from DeGroot and Schervish's *Probability and Statistics* unless otherwise noted) A digital copy of the textbook is available for on our class PWeb site, under the Day One Access tab.

(a) Section 8.5 (just pages 489 - 493)

II. **Objectives** (By the end of the day's class, students should be able to do the following:)

- Define a pivotal quantity and explain how it can be used to construct a confidence interval for a parameter.
- Construct theoretical confidence intervals for a variety of parameters beyond just the sample mean.
- Describe several shortcomings of confidence intervals.

III. **Reflection Questions** (Submit answers on Gradescope <https://www.gradescope.com>)

1) Suppose $\mathbf{X}$ is a sample from $N(\mu, \sigma^2)$ with both μ and σ^2 unknown. What is the pivotal quantity for the population mean μ ? *Hint: Think back to the formula for constructing confidence intervals in Theorem 8.5.1 from Wednesday's reading.*

2) Suppose we collect a random sample $\mathbf{X}$ of size 16 from a population $N(\mu, \sigma^2)$ with μ, σ^2 unknown. From the sample, we compute the sample mean of $\bar{x} = 10$ and sample variance $s^2 = 25$, and then use this to construct the 95% confidence interval for μ : (7.33, 12.66).

Explain why it would be incorrect to say that "this particular interval (7.33, 12.66) has a 95% probability of containing the population mean μ ."

Note: This has nothing to do with mistakes in the confidence interval formula, and everything to do with how we interpret the results of a confidence interval.

IV. **Additional Feedback** Are there any topics you would like further clarification about? Do you have any additional questions based on the readings / videos? *If not, you may leave this section blank.*