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 9.1 (pages 540 - 545, from section titled "Equivalence of Tests and Confidence Sets" through section titled "Likelihood Ratio Tests with Large Samples")

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

- Explain the equivalency between Confidence Sets and Hypothesis Tests
- Demonstrate for particular models how to create a confidence interval from a hypothesis test
- Demonstrate for particular models how to create a hypothesis test using a confidence interval
- State the definition of the likelihood ratio test, and perform a likelihood ratio test for a particular likelihood function

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

1) Suppose data $\mathbf{X}$ is collected from a distribution with unknown parameter $\theta$, and that this data will be used to construct an exact 95% confidence interval $(A, B)$ for $\theta$. Let $\delta$ be the test procedure that rejects $H_0 : \theta = \theta_0$ when $\theta_0 \notin (A, B)$. What is the size of this test?
2) In your own words, explain what the likelihood ratio $\Lambda(\mathbf{x})$ represents. Then briefly discuss why small values of $\Lambda(\mathbf{x})$ represent data that are inconsistent with the null hypothesis $H_0 : \theta \in \Omega_0$ (that is, data for which we should reject $H_0$).

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.*