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 430 - 538 only, through the section on "Making a Test Have a Specific Significance Level")

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

- State the definition of the Null and Alternative hypotheses in the language of parameter spaces, both for simple and composite hypotheses, and in terms of one- and two-sided hypotheses.
- Give the definition of the test procedure, the critical region and the test statistic for a hypothesis test.
- Conduct hypothesis tests in a variety of frameworks for real data.
- State the definition of the power function and explain how it relates to the critical region and the probability of type I and type II errors.

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

1) In your own words, summarize the relationship between the partition of the parameter space into subsets Ω_0 and Ω_1 (as on pages 530 - 531) and the partition of sample space into subsets S_0 and S_1 (as on pages 532 - 533)

2) Suppose $\mathbf{X}$ is a sample from $N(\mu, 1)$ with μ unknown, and that we wish to test the hypotheses

$$H_0 : \mu = 0 \qquad H_1 : \mu \neq 0$$

Consider the following test procedure δ using the test statistics $T = \bar{X}$: "Regardless of the value of $\bar{X}$, reject H_0".

i. What is the rejection region for this procedure?

ii. Explain why the power function for this procedure is $\pi(\theta|\delta) = 1$.

iii. Briefly explain why this would not be a particularly useful procedure, even though the power function is always 1. *Hint: think about the rate of Type I error.*

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.*