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) 7.2

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

- State the definition of the prior distribution of a parameter and interpret it from a Bayesian perspective. Give examples of prior distributions for several common parametric models.
- State the definition of the posterior distribution of a parameter and interpret it from a Bayesian perspective. Explain how a posterior distribution relates to a prior distribution.
- Define the *likelihood function*, and explain in non-technical language what it represents.
- Compute the posterior distribution using the likelihood function and prior distribution, without computing the normalizing constant.

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

1) Suppose two people plan to flip a coin with an unknown probability θ of landing heads. The first suggests a discrete uniform distribution on the two values $\{0, 1\}$, while the second suggests a continuous uniform distribution on the interval $[0, 1]$. Explain, in non-technical language, what each choice of prior distribution represents about the individual's beliefs about the coin.
2) In example 7.2.1 (and many other experiments), we assume that observable data $X_1, X_2, \ldots$ are conditionally independent given θ. Is it also true that the data is unconditionally independent? Explain why or why not.
3) In example 7.2.7, we see that a uniform prior for the proportion of defective items produces a beta posterior. What is another prior distribution for the proportion that would also produce a beta posterior?

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.*