

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 7.3

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

- State the definition for a conjugate prior of a likelihood function and discuss the utility of conjugate distributions
- Identify whether a particular distribution is a conjugate prior for a given likelihood function.
- Define improper priors, explain why they are not proper distributions, and describe how they may be used to compute posterior distributions.

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

- 1) Describe one reason why using a conjugate prior is useful when working with a particular likelihood function.
- 2) True or False? Saying that “Beta is the conjugate prior for the Binomial distribution“ means that if the likelihood function for the data is

$$f(x|\theta) = \binom{n}{x} \theta^x (1 - \theta)^{n-x}$$

then choosing a Binomial prior will result in a Beta posterior distribution.

- 3) Briefly explain what is “improper” about improper priors.

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.*