

# MAT453 - ASSIGNMENT 10

Spring 2025

Assignment Due (by 11:59 P.M.): Sunday, April 13th

**Directions:** You may discuss the exercises with other students and with the instructor, but the work you turn in must be your own. You will need to submit a scanned copy or picture of your written answer in **one** pdf file.

**Exercises:** (10 points total) Finish the question below:

1. Suppose that one single  $Y$  is a binomial random variable based on  $n$  trials and success probability  $p$ .
  - Use the conjugate beta prior with parameters  $\alpha$  and  $\beta$  to derive the posterior distribution of  $p|Y$ .
  - Determine the Bayes estimator for  $p$ ,  $\hat{p}_B$ .
2. Install the package *RStan* in R. It is used to run MCMC/Bayesian algorithms. Make sure it can be successfully loaded. Also, try to look up some examples online and run them.