Math 459 HW4

Due Tuesday, April 26

Guidelines:

- You must show your work to get credit.
- Include your **R** code and the output (just copy+paste into a text file).

Use the `heart` data in the `ncvreg` package. This dataset contains 462 observations on 10 variables. The response variable is `chd`, which indicates whether or not coronary heart disease was present at the time of observation.

(a) Using a package of your choosing, fit Bayesian probit and logistic regression models. Explain which package and priors are used.

(b) Using a method (Laplace and/or MCMC) of your choosing, estimate the marginal likelihood for each model and hence estimate the Bayes factor. Explain how the marginal likelihood is estimated according to the method you have chosen. Give an interpretation of the computed value of the Bayes factor.

(c) Remove one data point from the original dataset. Fit the probit and logistic models again. Provide a HPD interval for the predicted value of the response using the predictor values for the one observation left out from the original dataset. This means you need to simulate from the posterior predictive distribution. Give a 95% HPD interval, as well as an estimate of the posterior predictive mean. Compare this estimate to the actual observed value of that response variable.