ISTA 311 Homework 3: Inference Problems

Due: Tuesday, October 15 in class

Complete the problems below. "LN" means the lecture notes. Submit this homework handwritten on a separate sheet or sheets of paper.

If you collaborate with another student on this assignment, please note the name of your collaborator(s) on your paper.

1. LN Chapter 5, Exercise 12
2. LN Chapter 5, Exercise 14
3. Recall the cookie problem from lecture. We have two bowls, Bowl 1 and Bowl 2. Bowl 1 contains 25% chocolate and 75% vanilla cookies; Bowl 2 has 50% of each. For this problem, assume each bowl is large enough that drawing a single cookie does not appreciably alter this ratio.

   Suppose we draw two cookies from the bowl and they are both chocolate. Calculate the posterior probabilities of the two bowls in two ways:

   (a) by treating the two cookies as one simultaneous piece of evidence

   (b) by updating the prior probabilities once using the first chocolate cookie, and using the posterior probabilities as prior probabilities in a second update.
4. Suppose instead we draw two cookies; one is chocolate and the other is vanilla. Calculate the posterior probabilities. Does it matter which cookie we drew first? Why or why not?