M362K (56310), Homework #2

Due: 12:30pm, Thursday, Feb. 03

Instructions: Please show all your work, not only your final answer, in order to receive credit. Please keep answers organized in the same order the problems have been assigned.

Conditional probability and independence (1.4)

1. Pitman, p. 45, #2

2. Pitman, p. 45, #5

3. Pitman, p. 46, #6

4. Pitman, p. 46, #8

5. Pitman, p. 46, #9

6. A family has two children, one of whom is a son. What is the probability that the family has two boys? Assume that children are equally likely to be boys or girls. (Note: This is similar to a problem we did in lecture.)

7. Show that if A and B are independent then A and B^c are independent.

8. Pitman, p. 45, #4

9. Pitman, p. 46, #10

10. Pitman, p. 74, #4

11. Pitman, p. 74, #5

12. Suppose that the birthdays of each of three people is equally likely to be any one of the 365 days of the year, independently of the others. Let B_{ij} be the event that person i has the same birthday as person j.

   a) Are the events B_{12} and B_{23} independent?

   b) Are the events B_{12}, B_{13}, and B_{23} pairwise independent?

   c) Are the events B_{12}, B_{13}, and B_{23} independent?

Bayes' rule (1.5)

13. Pitman, p. 53, #2

14. Pitman, p. 53, #3

15. Pitman, p. 54, #5

16. Pitman, p. 54, #6

Puzzle of the week (optional!)

In #6, suppose we are instead told that the family has two children, one of whom is a son born on a Tuesday. Assume that children are equally likely to be boys or girls born on any day of the week. What is the probability that the family has two boys? Does your answer surprise you?