Math 351, Probability
Problem Set 4
Due October 2, 2012, in class

1. You get two letters in the mail one day. The first letter you open is from a woman. Find the probability that the other letter is also from a female if

   (a) the mailman does not look at the letters before he gives them to you,

   (b) the mailman has a ladies first policy and will always hand you a letter from a woman first if there is such a letter.

2. Each of thirteen people is given 4 cards from a standard deck of 52 cards. What is the probability that each of them has one spade?

3. Urn A has 99 red balls and 1 green ball. Urn B has 1 red ball and 99 green balls. An urn is picked at random and a ball is chosen from it. If the ball is red, what is the probability that it came from urn A?

4. A fair die is rolled. If the outcome is i, then a ball is drawn from an urn that has i red balls and 1 blue ball. Suppose that a blue ball was drawn. For each $i = 1, 2, ..., 6$, determine the probability that the outcome of the roll of the die was i.

5. Assume $P(E) = 0.5$, $P(F) = 0.3$, and events E and F are independent. Find $P(E \cup F)$.

6. In a class, there are 5 girls who are at least 20, 7 boys who are under 20 and 9 girls who are under 20. Is it possible for the events at least 20 and girl to be independent if a student is drawn at random from the class?