STAT/MA 41600
Practice Problems: October 6, 2014

1. Hearts. In a game of chance, you are allowed to shuffle a standard deck of cards and then choose 3 cards randomly (without replacement). If two or more of them are hearts, then you win.

a. What is the probability of winning the game?

b. What is the expected number of hearts drawn?

2. Socks. In my sock drawer there are 21 white socks, 8 black socks, and 4 brown socks. (The socks are *not* folded into pairs.)

a. If I randomly pull out 6 socks to take with me on a trip, what is the probability that I pull out exactly 2 socks of each color?

b. What is the probability all the socks are the same color?

c. What is the probability that I pull out 2 socks of one color and 4 socks of a second color?

3. Married couples. A group of men and women sit in a circle. There are 20 chairs in the circle, and 10 pairs of married individuals. What is the expected number of men who are sitting directly across the room from their (respective) wives?

4. Ramen Noodles. There are 20 ramen noodles in a bag. There are 10 beef flavored, and the other 10 are chicken flavored.

a. What is the probability of getting at least one chicken and at least one beef flavor when you grab 3 packages randomly?

b. What is the probability that all three types are of the same flavor?

5. Picking letters at random. Five friends, named Albert, Bob, Charlie, Daniel, and Edward, each pick a letter from the alphabet on their own (i.e., independently), with all possible outcomes equally likely. For instance, they might pick (starting with Albert's choice) "M,D,P,Z,P".

a. What is the probability that they choose 5 distinct letters?

b. What is the probability that they choose 5 distinct letters *and that the letters are in increasing alphabetic order starting from Albert's choice and ending at Edward's choice*? For instance, starting with Albert's choice, "D,H,P,T,X" would be such an alphabetical ordering.