MAS 250 Homework Assignment 2

Due: September 23 (Friday) 1 pm

1. A lottery game asks players to choose a three-digit number, 000 to 999. It chooses the winning three-digit number at random, so that each number has probability 1/1000. You win if the winning number contains the digits in your number, in any order.

   (a) Your number 491.What is your probability of winning?

   (b) Your number is 222. What is your probability of winning?

2. (a) A faculty search committee of 3 people are to be formed from a group of 5 men and 4 women. If 3 people are selected at random, what is the probability that at least 2 women are included?

   (b) Out of 12 people applying for an assembly job, 3 cannot do the work. If two persons are chosen randomly, what is the probability that neither will be able to do the job?

3. The following probabilities are given for two events A and B:

$$P(A) = \frac{1}{2}, \quad P(B) = \frac{1}{4}, \quad P(A|B) = \frac{1}{3}$$

   (a) Compute $P(A^c)$, $P(AB) = P(A \cap B)$, and $P(A \cup B)$.

   (b) Compute $P(AB^c)$ and $P(A^c \cup B^c)$.

4. An electronic fuse is produced by three production lines in a manufacturing operation. Assume that all three production lines produce fuses at the same rate and production line 1 produces 10%, line 2 20%, and line 3 30% defective fuses, respectively. One day a customer received items from one of the three lines, tested five fuses, and two failed. What is the probability that the items were produced on line 3?

5. Suppose that the probability of exposure to the flu during an epidemic is 0.6. Experience has shown that a serum is 80% successful in preventing an inoculated person from acquiring the flu, if exposed to it. A person not inoculated faces a probability of 0.90 of acquiring the flu if exposed to it. Two persons, one inoculated and one not, perform a highly specialized task in a business. Assume that they are not at the same location, are not in contact with the same people, and cannot expose each other to the flu. What is the probability that at least one will get the flu?

6. From the exercise problems in Chapter 3:

   18, 21, 26, 29, 34, 37, 42

7. (Suggested: no submission)

   5, 12, 13, 17, 25, 27, 30, 40, 43, 45, 48