MA 2621 - A 17

HW #4 (Problems 1-8) **Due: W 09/27**

#1 A batch of one hundred items is inspected by testing four randomly selected items. If one of the four is defective, the batch is rejected. What is the probability that the batch is accepted if it contains ten defectives?

#2. Suppose you draw 5 cards out of a deck of 52 and get 2 spades and 3 hearts. What is the probability that the first card drawn was a spade?

#3. A, B and C are events with P(A)= 0.3, P(B)= 0.4 and P(C)=0.5, A and B are disjoint, A and C are independent, and P(B|C) = 0.1. Find $P(A \cup B \cup C)$.

#4. Box I contains 4 red and 8 blue marbles while box II contains 5 red and 3 blue marbles. An unfair coin is tossed – whose probability of turning up heads is 40%. If the coin comes up heads box I is chosen and a random marble is chosen, otherwise if it is tails the marble is chosen from box II.

(a) Find the probability a red marble is chosen.
(b) If a red marble is chosen, what is the probability it came from box I?
(c) **If a blue marble is chosen**, what is the probability it came from box I?

Suppose after the first marble is chosen – the experiment is repeated.

Assume the first marble is NOT put back into its box. The coin is flipped again and another marble is chosen from either box I or box II.

(d) What is the probability that the second marble has the same color as the first marble?

#5. We are given three coins: one has heads in both faces, the second has tails in both faces, and the third has a head in one face and a tail in the other. We choose a coin at random, toss it, and it comes heads. What is the probability that the opposite face is tails?

#6. A car insurance company has high-risk, medium-risk, and low-risk clients, who have, respectively, probabilities .04, .02, and .01 of filing claims within a given year. The proportions of the numbers of clients in the three categories are .15, .25, and .60, respectively.

(a) What is the probability that a random client doesn't file a claim?
(b) What proportion of the claims filed each year come from high-risk clients?
(c) What is the probability that a random client who didn't file a claim is low- risk?

#7. Three boxes contain red and green balls. Box 1 has 5 red balls* and 5 green balls*, Box 2 has 7 red balls* and 3 green balls* and Box 3 contains 6 red balls* and 4 green balls*. The respective probabilities of choosing a box are 1/4, 1/2, 1/4. What is the probability that the ball chosen is green?

(a) What is the probability that the ball chosen is green?
(b) What is the probability that the ball came from box 2, if it was red?

#8. A hunter has two hunting dogs. One day, on the trail of some animal, the hunter comes to a place where the road diverges into two paths. He knows that each dog, independently of the other, will choose the correct path with probability p. The hunter decides to let each dog choose a path, and if they agree, take that one, and if they disagree, to randomly pick a path (probability for each path is 0.5). Is his strategy better than just letting one of the two dogs decide on a path? (Explain your answer using a tree diagram)

==========

Suggested Problems: 2, 6, 8, 16, 20, 24, 32, 34, 38, 44.