

HOMEWORK 9 - MATH 111

DUE DATE: Monday, December 13

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. In a 2-child family, if we assume that the probabilities of a male child and a female child are each 0.5, are the events “each child is the same sex” and “at most one male” independent? Are they independent for a 3-child family?
2. In 2000, 7% of Americans were diabetic, 19% of Americans were obese and 80% of the diabetics were obese. Find the probability that an American is a diabetic given that that person is obese.
3. During the murder trial of O.J. Simpson, Alan Dershowitz, an adviser to the defense team, stated on television that only about 0.1% of men who batter their wives actually murder them. Statistician I.J. Good observed that even if given that a husband is a batterer, the probability that he is guilty of murdering his wife is 0.001, what we really want to know is the probability that the husband is guilty given that the wife was murdered. Good estimates the probability of a battered wife been murdered, given that her husband is not guilty, as 0.001. The probability that she is murdered given that the husband is guilty is 1 of course. Using these numbers and Dershowitz’s 0.001 probability of the husband being guilty, find the probability that the husband is guilty, given that the wife was murdered.
4. The probability that a person with certain symptoms has hepatitis is 0.8. The blood test used to confirm this diagnosis gives positive results for 90% of people with the disease and 5% of those without the disease. What is the probability that an individual who has the symptoms and who reacts positively to the tests actually has hepatitis?
5. How many different 4-letter radio station call letters can be made
 - (a) if the first letter must be K or W and no letter may be repeated?
 - (b) if repeats are allowed but the first letter must be K or W?
 - (c) How many of the 4-letter call letters starting with K or W with no repeats end in R?
6. A salesperson has the name of 6 prospects.
 - (a) In how many ways can she arrange her schedule if she calls on all 6?
 - (b) In how many ways can she arrange her schedule if she can call on only 4 of the 6?
7. A bridge hand consists of 13 cards from a deck of 52. Find the probabilities that a bridge hand includes each of the following: (a) 6 face cards, (b) 2 aces and 3 kings, (c) 7 cards of one suit and 6 of another.
8. Of the 16 members of President Clinton’s cabinet, 4 were women. Suppose the president randomly selected 4 advisers from the cabinet for a meeting. Find the probability that the group of 4 would be composed by (a) 2 women and 2 men, (b) all men, (c) at least 1 woman.