MATH 320: Homework 4-5

Due _____ : Turn in a hard copy, neat and stapled.

1. A swim team consists of 6 boys and 4 girls. A relay team of 4 swimmers is chosen at random from the team members. What is the probability that 2 boys are selected for the relay team given that the first 2 selections were girls?

2. An actuary is studying the prevalence of three health risk factors, denoted A, B and C, within a population of women. For each of the three factors, the probability is 0.12 that a women in the population has only this risk factor (and no others). For any two of the three risk factors, the probability is 0.15 that she has exactly these two risk factors (but not the other). The probability that a woman has all three risk factors, given that she has A and B, is 1/3.

   (a) Find the probability that a woman has all three risk factors.

   (b) Find the probability that a woman has none of the three risk factors, given that she does not have risk factor A.

3. If A and B are independent events, prove $\sim A$ and $\sim B$ are also independent.

4. For the experiment of tossing a single fair coin 3 times, let E be the event the first toss is a head and F be the event 2 heads and 1 tail are tossed. Show if E and F are independent.

5. A jar contains 10 marbles: 4 red and 6 blue. A second jar contains 16 red marbles and an unknown number of blue marbles. A single marble is drawn from each jar.

   (a) Suppose the probability that both marbles are red is 0.256. Calculate the number of blue marbles in the second jar.

   (b) Now suppose the probability that both marbles are the same color is 0.44. Calculate the number of blue marbles in the second jar.

6. An insurance company pays hospital claims. The number of claims that include emergency room or operating room charges is 85% of the total number of claims. The number of claims that do not include emergency room charges is 25% of the total number of claims. The occurrence of emergency room charges is independent of the occurrence of operating room charges on hospital claims.

   Calculate the probability that a claim submitted to the insurance company includes operating room charges.

1. Prob ≈ 0.536

2. (a) Prob $= 0.075$

   (b) Prob ≈ 0.228

3.

4.

5. (a) 4

   (b) 9

6. Prob $= 0.4$