BRAC UNIVERSITY
Inspiring Excellence

STA201 – Spring 2022 – Section 12

Assignment 3

1. Suppose each of three persons tosses a coin. If the outcome of one of the tosses differs from the other outcomes, then the game ends. If not, then the persons start over and re-toss their coins. Assuming fair coins, what is the probability that the game will end with the first round of tosses? If all three coins are biased and have probability 1/4 of landing heads, what is the probability that the game will end at the first round?

2. A box contains ten marbles: two red, five green, and three blue.
   a. Consider an experiment that consists of taking one marble from the box then replacing it in the box and drawing a second marble from the box. What is the sample space? If, at all times, each marble in the box is equally likely to be selected, what is the probability of each point in the sample space?
   b. Repeat the previous experiment when the second marble is drawn without replacing the first marble.

3. Suppose, you are rolling two regular six-sided dice and two four-sided dice together. Let's say, the sum of the numbers appearing on the two regular six-sided dice is 'A' and the sum of the numbers appearing on the two four-sided dice is 'B'. What is the probability that the product of A and B is 12?

4. Sixty percent of the families in a certain community own their own car, thirty percent own their own home, and twenty percent own both their own car and their own home. If a family is randomly chosen, what is the probability that this family owns a car or a house but not both?

5. Assume that the chances of a patient suffering from high blood pressure is 40%. It is also assumed that a course of meditation reduces the risk of high blood pressure by 35% and prescription of certain drugs reduces its chances by 65%. At a time, a patient can choose any one of the two options with equal probabilities. It is given that after going through one of the two options, the patient selected at random does not suffer from high blood pressure. Find the probability that the patient chose a course of meditation?

6. Urn 1 has five white and seven black balls. Urn 2 has three white and twelve black balls. We flip a fair coin. If the outcome is heads, then a ball from urn 1 is selected, while if the outcome is tails, then a ball from urn 2 is selected. Suppose that a white ball is selected. What is the probability that the coin landed tails?

7. There are three coins in a box. One is a two-headed coin, another is a fair coin, and the third is a biased coin that comes up heads 75 percent of the time. When one of the three coins is selected at random and flipped, it shows heads. What is the probability that it was the two-headed coin?