Probability Practice Questions

Solved Exercises

1) If I roll two dice simultaneously, then what is the probability of getting the sum as
    a. 1
    b. 5
    c. <=12

   Sol: The sample space S is :

   S = { (1,1),(1,2),(1,3),(1,4),(1,5),(1,6)
        (2,1),(2,2),(2,3),(2,4),(2,5),(2,6)
        (3,1),(3,2),(3,3),(3,4),(3,5),(3,6)
        (4,1),(4,2),(4,3),(4,4),(4,5),(4,6)
        (5,1),(5,2),(5,3),(5,4),(5,5),(5,6)
        (6,1),(6,2),(6,3),(6,4),(6,5),(6,6) }

   a. Consider event A as "sum of dice equal to 1". We can see from the sample space that none of the outcome produces a sum of 1. Thus
   P(A) = n(A) / n(S) = 0 / 36 = 0

   b. Consider event A as "sum of dice equal to 5". We can see from the sample space that 4 of the outcome produces a sum of 5 A = {(1,4),(2,3),(3,2),(4,1)}. Thus

   P(A) = n(A) / n(S) = 4/ 36 = 1/9

   c. Consider event A as "sum of dice less than or equal to 12". We can see from the sample space that all of the outcomes produce this event. Thus

   P(A) = n(A) / n(S) = 36/ 36 = 1

2) A jar contains 5 red marbles, 8 green marbles and 12 white marbles. If a marble is drawn from the jar at random, what is the probability that this marble is white?

Sol: P(W) = n(W)/n(S) = 12/25

3) Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number that is a multiple of 3 or 5?

Sol: Let S be the sample space. S = {1,2,3,.....18,19,20}
A = number being a multiple of 3 or 5 = {3,6,9,12,15,18,5,10,20}
Thus, P(A) = n(A)/n(S) = 9/20

4) An organization has 7 Male and 5 Female employees. Randomly, two employees are selected for a training program. Find the probability that both of them are Female?

Sol: There are 12 employees. We want to select two from them. The number of ways to do so is

$12C2 = \dfrac{12(11)}{2} = 6*11 = 66$

Number of ways in which we can select two Female are

$5C2 = \dfrac{5(4)}{2} = 5*2 = 10$

Thus, probability is 10/66 = 5/33

Unsolved

1) A jar contains 5 red, 9 blue and 14 white marbles. If a marble is drawn from the jar at random, then what is the probability that the marble is neither red nor white?
2) I toss a coin three times. What is the probability of getting a head at most two times?
3) If I roll two dice simultaneously, then what is the probability of getting the numbers such that their sum is odd?
4) Two cards are drawn randomly from a pack of 52 cards. Find the probability that both cards are aces?
    a. For the case where cards are drawn with replacement.
    b. For the case where cards are drawn without replacement.
5) There are two events A and B. Assume P(A) = 0.25, P(B) = 0.45, and P(A ∩B) = 0.1.
    a. What is P(A U B)?
    b. What is P(A' ∩ B)?
6) Consider two sets X and Y.
    X = {A, B, C, D, E}
    Y = {P, Q, R, S, T, U}

    If you select one letter each from X and Y, then find the probability of

    a. Getting an A and T.
    b. Getting an A or T.

7) In ABC, there are 300 IT employees and 100 Management employees. 20% of IT employees have a college education and 40% of Management employees have college education. If one employee is randomly chosen for promotion, then find the probability that the employee is Management employee and has college education?