Assignment 3

AI1110: Probability and Random Variables
Indian Institute of Techonology Hyderabad

Sudarshan Shivashankar
AI22BTECH11027

Question 10.15.1.14 : One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting

1) a king of red colour
2) a face card
3) a red face card
4) the jack of hearts
5) a spade
6) the queen of diamonds

Solution:

EVENT	DESCRIPTION
E	Event of picking a card.
T	Sample space of picking a card.
K	Event of the card picked be a king of red colour.
F	Event of the card picked be a Face card.
R	Event of the card picked be a red face card.
J	Event of the card picked be the Jack of Hearts.
S	Event of the card picked be Spade.
Q	Event of the card picked be Queen of Diamonds.

TABLE 1

Total number of cards = 52

$$n(T) = 52 \tag{1}$$

$$\Pr(E) = \frac{n(E)}{n(T)} \tag{2}$$

a) Total number of kings of red colour = 2

$$\Pr(K) = \frac{n(K)}{n(T)} \tag{3}$$

$$\Pr(K) = \frac{2}{52} = 0.038 \tag{4}$$

$$\therefore \Pr(K) = 0.038 \tag{5}$$

b) Number of cards that are face cards = 12

$$\Pr(F) = \frac{n(F)}{n(T)} \tag{6}$$

$$\Pr(F) = \frac{12}{52} = 0.23 \tag{7}$$

$$\therefore \Pr(F) = 0.23 \tag{8}$$

c) Number of cards that are red face cards = 6

$$\Pr(R) = \frac{n(R)}{n(T)} \tag{9}$$

$$\Pr(R) = \frac{6}{52} = 0.11 \tag{10}$$

$$\therefore \Pr(R) = 0.11 \tag{11}$$

d) Number of cards that are jack of hearts = 1

$$\Pr(J) = \frac{n(J)}{n(T)} \tag{12}$$

$$\Pr(J) = \frac{1}{52} = 0.019 \tag{13}$$

$$\therefore \Pr(J) = 0.019 \tag{14}$$

e) Number of cards that are spade = 13

$$\Pr(S) = \frac{n(S)}{n(T)} \tag{15}$$

$$\Pr(S) = \frac{13}{52} = 0.25 \tag{16}$$

$$\therefore \Pr(S) = 0.25 \tag{17}$$

f) Number of cards that are queens of diamonds = 1

$$\Pr(Q) = \frac{n(Q)}{n(S)} \tag{18}$$

$$\Pr(Q) = \frac{1}{52} = 0.019 \tag{19}$$

$$\therefore \Pr(Q) = 0.019 \tag{20}$$