Assignment 3

AI1110: Probability and Random Variables
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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:

Let X be a Random Variable

EVENT	DESCRIPTION
E	Event of picking a card.
S	Sample space of picking a card.
X=0	Event of the card picked be a king of red colour.
X=1	Event of the card picked be a Face card.
X=2	Event of the card picked be a red face card.
X=3	Event of the card picked be the Jack of Hearts.
X=4	Event of the card picked be Spade.
X=5	Event of the card picked be Queen of Diamonds.

TABLE 1

Total number of cards = 52

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

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

a) Total number of kings of red colour = 2

$$\Pr(X = 0) = \frac{n(X = 0)}{n(S)} \tag{3}$$

$$\Pr(X = 0) = \frac{2}{52} = 0.038 \tag{4}$$

$$\therefore \Pr(X = 0) = 0.038 \tag{5}$$

b) Number of cards that are face cards = 12

$$\Pr(X = 1) = \frac{n(X = 1)}{n(S)} \tag{6}$$

$$\Pr(X = 1) = \frac{12}{52} = 0.23 \tag{7}$$

$$\therefore \Pr(X = 1) = 0.23 \tag{8}$$

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

$$\Pr(X = 2) = \frac{n(X = 2)}{n(S)} \tag{9}$$

$$\Pr(X = 2) = \frac{6}{52} = 0.11 \tag{10}$$

$$\therefore \Pr(X = 2) = 0.11 \tag{11}$$

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

$$\Pr(X = 3) = \frac{n(X = 3)}{n(S)} \tag{12}$$

$$\Pr(X = 3) = \frac{1}{52} = 0.019 \tag{13}$$

$$\therefore \Pr(X = 3) = 0.019 \tag{14}$$

e) Number of cards that are spade = 13

$$\Pr(X = 4) = \frac{n(X = 4)}{n(S)} \tag{15}$$

$$\Pr(X = 4) = \frac{13}{52} = 0.25 \tag{16}$$

$$\therefore \Pr(X = 4) = 0.25 \tag{17}$$

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

$$\Pr(X = 5) = \frac{n(X = 5)}{n(S)} \tag{18}$$

$$\Pr(X = 5) = \frac{1}{52} = 0.019 \tag{19}$$

$$\therefore \Pr(X = 5) = 0.019 \tag{20}$$