AI1110: Probability and Random Variable Assignment-2

Saksham*

AI22BTECH11024

Question: 11.16.3.4

Problem Statement:

A card is selected from a pack of 52 cards.

1) How many points are there in the sample space?
2) Calculate the probability that the card is an ace of spades.
3) Calculate the probability that the card is
   a) an ace
   b) a black card

Solution:

It is given that there are 52 cards in the deck,

Event	Value	Description
A	n(A) = 1	Drawing ace of spades
B	n(B) = 4	Drawing an ace
C	n(C) = 26	Drawing a black card

1) Number of points in the sample space = 52 (given)
   n(S) = 52
2) Let us assume 'A' be the event of drawing an ace of spades.

$$A = 1 \tag{1}$$
$$\implies n(A) = 1 \tag{2}$$
$$\Pr(A) = n(A)/n(S) = 1/52 \tag{3}$$

3) a) Let us assume 'B' be the event of drawing an ace. There are four aces.

$$\implies n(B) = 4 \tag{4}$$
$$\Pr(B) = n(B)/n(S) \tag{5}$$
$$= 4/52 \tag{6}$$
$$= 1/13 \tag{7}$$

b) Let us assume 'C' be the event of drawing a black card. There are 26 black cards.

$$n(C) = 26 \tag{8}$$
$$\Pr(C) = n(C)/n(S) \tag{9}$$
$$= 26/52 \tag{10}$$
$$= 1/2 \tag{11}$$

*The student is with the Department of Artificial Intelligence, Indian Institute of Technology, Hyderabad, 502285, India. e-mail: ai22btech11024@iith.ac.in.