

NCERT Assignment 2

EE22BTECH11026 - KARTHIKEYA HANU PRAKASH KANITHI

Question : A card is selected from a pack of 52 cards.

- How many points are there in the sample space?
- Calculate the probability that the card is an ace of spades.
- Calculate the probability that the card is (i) an ace and (ii) black card.

Solution: The probabilities are as follows:

TABLE 3
RANDOM VARIABLES AND PROBABILITY TABLE

Random Variable	Value of R.V.	Description
X	1, 2, 3, 4	Type of the card
Y	1, 2, 3, ..., 13	Number of the card
Z	1, 2	Colour of the card

$$p_x(X = k) = \frac{1}{4}, \quad k \in [1, 4] \quad (1)$$

$$p_x(Y = k) = \frac{1}{13}, \quad k \in [1, 13] \quad (2)$$

$$p_x(Z = k) = \frac{1}{2}, \quad k \in [1, 2] \quad (3)$$

- The sample space consists of all possible outcomes when selecting a card. Therefore, the sample space contains 52 points.

(b)

$$\Pr(X = 1, Y = 1) = p_x(X = 1)p_x(Y = 1) \quad (4)$$

$$= \left(\frac{1}{4}\right)\left(\frac{1}{13}\right) = \frac{1}{52} \quad (5)$$

- The probability when the card chosen is ,

(i) An ace

$$\Pr(Y = 1) = \frac{1}{13} \quad (6)$$

(ii) Black card ($Z=1$)

$$\Pr(Z = 1) = \frac{1}{2} \quad (7)$$