Assignment 4
NCERT Class 11 Chapter 16 Miscellaneous Exercise
Question 2

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Outline

Question

4 cards are drawn from a well-shuffled deck of 52 cards. What is the probability of obtaining 3 diamonds and one spade?

Solution

Let X and Y be the events defined as follows,
X : Picking three diamond cards
Y : Picking a spade card

For X

Number of possible ways of choosing three diamonds from a well-shuffled deck of 52 cards is given by,

$$n(X) = \binom{13}{3} \tag{1}$$

For X

Number of possible ways of choosing one spade from a well-shuffled deck of 52 cards is given by,

$$n(Y) = \binom{13}{1} \tag{2}$$

Sample Space

Number of possible ways of choosing four cards from a well-shuffled deck of 52 cards is given by,

$$n(S) = \binom{52}{4} \tag{3}$$

Solving

Number of possible ways of choosing three diamonds and one spade from a well-shuffled deck of 52 cards is given by,

$$n(XY) = \binom{13}{3} \times \binom{13}{1} \tag{4}$$

Probability of getting 3 diamonds and 1 spade is given by,

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

$$= \frac{\binom{13}{3} \times \binom{13}{1}}{\binom{52}{4}} \tag{6}$$

$$= \frac{3178}{270725} \tag{7}$$

$$= 0.0137 \tag{8}$$

Therefore, the probability of getting 3 diamonds and 1 spade is 0.0137.