AI1110 ASSIGNMENT-6

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***Abstract*—This document contains the solution for Assignment 6 (NCERT GRADE 10 CHAPTER 15 Exercise 15.2 Example 4)**

EXAMPLE 4 :

One card is drawn from a well-shuffled deck of 52 cards. Calculate the probability that the card will

(i) be an ace,
(ii) not be an ace.

SOLUTION :

1) A deck of 52 cards have 4 suits namely "Clubs , Spades , Diamonds and Hearts".
2) Clubs and Spades are of black colour ,while Hearts and Diamonds are of red colour.
3) Each suit have 13 cards, they are King ,Queen ,Jack ,10 ,9 ,8 ,7 ,6 ,5 ,4 ,3 ,2 and ace.

Given that , A card is drawn from a well-shuffled deck of 52 cards; well-shuffling ensures "Equally Likely" outcomes.

Let X be a random variable and X maps to the following set of real number , $X \in \{0, 1\}$, where $X = 0$ denote that "the drawn card is not an ace" , $X = 1$ denote that "the drawn card is an ace". We know that there are 4 aces in a deck of 52 cards. So ,

(i) The Probability that the drawn card is an ace is same as ,

$$\Pr(X = 1) = \frac{\text{Number of ace cards}}{\text{Total Number of cards}} \tag{1}$$

$$\Pr(X = 1) = \frac{4}{52} = \frac{1}{13} \tag{2}$$

(ii) The Probability that the drawn card is not an ace is same as ,

$$\Pr(X = 0) = \frac{\text{Number of non-ace cards}}{\text{Total Number of cards}} \tag{3}$$

$$\Pr(X = 0) = \frac{52 - 4}{52} = \frac{48}{52} = \frac{12}{13} \tag{4}$$

One can also say that , the drawn card being an ace and the drawn card not being an ace are complementary events . So , we can write that,

$$\Pr(X = 0) = 1 - \Pr(X = 1) \tag{5}$$

$$= 1 - \frac{1}{13} = \frac{12}{13} \tag{6}$$

which gives the same result.