

Assignment 1

Varenya Upadhyaya EP20BTECH11026

Problem 5.24

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

It is known that the total number of cards in the deck is 52, out of which there are four aces. Let random variable $X \in \{0, 1\}$ denote the possible outcomes of the experiment of drawing a card from the shuffled deck.

Card	X	Number
Ace	0	$n(X = 0) = 4$
Not an Ace	1	$n(X = 1) = 48$

$$p(X = 0) = \frac{n(X = 0)}{n(X = 0) + n(X = 1)} = \frac{4}{52} \quad (1)$$

$$\Rightarrow p(X = 0) = 0.076923 \quad (2)$$

Similarly,

$$p(X = 1) = \frac{n(X = 1)}{n(X = 0) + n(X = 1)} = \frac{48}{52} \quad (3)$$

$$\Rightarrow p(X = 1) = 0.923077 \quad (4)$$

Hence, the required probabilities are:

- (i) 0.076923
- (ii) 0.923077