Assignment 1

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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)
Not an Ace	1	n(X = 1)

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

$$\Rightarrow p(X=0) = 0.076923 \tag{2}$$

Similarly,

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

$$\Rightarrow p(X=1) = 0.923077 \tag{4}$$

Hence, the required probabilities are:

(i) 0.076923

(ii) 0.923077