

AI1110 Assignment III (ICSE Class 12 2018)

Santoshi Gayatri (CS21BTECH11036)

Question: One card is drawn from a well shuffled deck of 52 cards. If each outcome is equally likely, calculate the probability that the card will be

- (i) a diamond
- (ii) not an ace
- (iii) a black card (i.e., a club or, a spade)
- (iv) not a diamond
- (v) not a black card

(v) Number of cards that are not black = $52 - 26 = 26$.

$$\Pr(X = 4) = \frac{26}{52} = \frac{1}{2} \quad (5)$$

Solution: Let $X = 0, 1, 2, 3, 4$ be a random variable representing outcomes of cards drawn from a deck.

Event	Description
$X=0$	A diamond
$X=1$	not an ace
$X=2$	a black card
$X=3$	not a diamond
$X=4$	not a black card

TABLE I

(i) Number of diamonds in a deck are 13.

$$\Pr(X = 0) = \frac{13}{52} = \frac{1}{4} \quad (1)$$

(ii) Number of cards which are not ace = $52 - 4 = 48$.

$$\Pr(X = 1) = \frac{48}{52} = \frac{12}{13} \quad (2)$$

(iii) Number of black cards(i.e. club or spade) in a deck are 26.

$$\Pr(X = 2) = \frac{26}{52} = \frac{1}{2} \quad (3)$$

(iv) Number of cards which are not diamond = $52 - 13 = 39$.

$$\Pr(X = 3) = \frac{39}{52} = \frac{3}{4} \quad (4)$$