

Ex.6: A bag contains (8) white and (6) red balls. (4) balls are drawn at random from this bag. Find the probability of the following events:

A: there will be (2) red balls.

B: there will be at least (2) white balls.

Solution:

$$\Rightarrow n = C_4^{14} = 143, n(A) = C_2^6 \cdot C_2^8 = 60$$

$$\Rightarrow P(A) = \frac{n(A)}{n} = \frac{C_2^6 \cdot C_2^8}{C_4^{14}} = \frac{60}{143}$$

$$n(B) = C_2^8 \cdot C_2^6 + C_3^8 \cdot C_1^6 + C_4^8 \cdot C_0^6 = 118$$

$$\Rightarrow P(B) = \frac{n(B)}{n} = \frac{118}{143}$$

Ex.7: Ten books are selected from (15) books.

- What is the probability that a certain two books must be chosen.
- What is the probability that a certain two books must left?

Solution:

Let A: Event that two books must be chosen.

B: Event that two books must be left.

$$n = C_{10}^{15} = 3003$$

$$\Rightarrow P(A) = \frac{n(A)}{n} = \frac{C_8^{13}}{C_{10}^{15}} = \frac{1287}{3003} = 0.428$$

$$\Rightarrow P(B) = \frac{n(B)}{n} = \frac{C_{10}^{13}}{C_{10}^{15}} = \frac{286}{3003} = 0.095$$

Ex.8: Let a card be selected at random from an ordinary deck with (52) cards:

$A = \{\text{the card is a spade}\}$

$B = \{\text{the card is a face card i. e. a jack, queen or king}\}$

Compute $P(A)$, $P(B)$ and $P(A \cap B)$.

Solution:

$$\Rightarrow P(A) = \frac{\text{number of spades}}{\text{number of cards}} = \frac{n(A)}{n} = \frac{C_1^{13}}{C_1^{52}} = \frac{13}{52} = \frac{1}{4}$$

$$\Rightarrow P(B) = \frac{\text{number of face card}}{\text{number of cards}} = \frac{n(B)}{n} = \frac{C_1^{12}}{C_1^{52}} = \frac{12}{52} = \frac{3}{13}$$

$$\Rightarrow P(A \cap B) = \frac{\text{number of spades face cards}}{\text{number of cards}} = \frac{n(AB)}{n} = \frac{C_1^3}{C_1^{52}} = \frac{3}{52}$$