Assignment 2

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LaTeX

Question

Q.1.X[ICSE 12, 2018] :
In a race, the probabilities of A and B winning the race are $\frac{1}{3}$ and $\frac{1}{6}$ respectively. Find the probability of neither of them winning the race?

Solution Page 1

Given,

$$P(A) = \frac{1}{3} \tag{1}$$

$$P(B) = \frac{1}{6} \tag{2}$$

We know that,
The Probability of two independent events A and B occurring simultaneously is given by the expression

$$P(A \cap B) = P(A)(B) \tag{3}$$

$$P(\bar{A} \cap \bar{B}) = 1 - P(A) - P(B) + P(A \cap B) \tag{4}$$

(since, $P(A \cap B)$ is removed twice, we need to add it once)

Solution Page 2

Now putting (1), (2), (3) in (4), we get

$$P(\bar{A} \cap \bar{B}) = 1 - \frac{1}{3} - \frac{1}{6} + \frac{1}{3} \times \frac{1}{6} \qquad (5)$$

$$P(\bar{A} \cap \bar{B}) = 1 - \frac{1}{3} - \frac{1}{6} + \frac{1}{18} \qquad (6)$$

$$P(\bar{A} \cap \bar{B}) = 1 - \frac{8}{18} \qquad (7)$$

$$P(\bar{A} \cap \bar{B}) = \frac{10}{18} \qquad (8)$$

so, The probability of neither of them winning the race is $\frac{10}{18}$