



Probability Assignment-II

Nikhil Nair

I. PROBLEM

Given that the events A and B are such that $P(A) = \frac{1}{2}$, $P(A + B) = \frac{3}{5}$ and $P(B) = p$. Find p if they are

- (i) mutually exclusive
- (ii) independent

II. SOLUTION

- (i) mutually exclusive

Given A and B are mutually exclusive events, then,

$$P(A + B) = P(A) + P(B) \quad (1)$$

$$\frac{3}{5} = \frac{1}{2} + p \quad (2)$$

$$\therefore p = \frac{1}{10} \quad (3)$$

- (ii) independent

Given A and B are independent events, then,

$$P(A + B) = P(A) + P(B) - P(AB) \quad (4)$$

$$P(A + B) = P(A) + P(B) - P(A)P(B) \quad (5)$$

$$\frac{3}{5} = \frac{1}{2} + p - \frac{p}{2} \quad (6)$$

$$\therefore p = \frac{1}{5} \quad (7)$$