

Exemplar Problem

Q. 71 If A and B be two events such that $P(A) = \frac{3}{8}$, $P(B) = \frac{5}{8}$ and

$P(A \cup B) = \frac{3}{4}$, then $P(A/B) \cdot P(A'/B)$ is equal to

(a) $\frac{2}{5}$

(b) $\frac{3}{8}$

(c) $\frac{3}{20}$

(d) $\frac{6}{25}$

Sol. (d) Here,

$$P(A) = \frac{3}{8}, P(B) = \frac{5}{8} \text{ and } P(A \cup B) = \frac{3}{4}$$

$$\therefore P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$\Rightarrow P(A \cap B) = \frac{3}{8} + \frac{5}{8} - \frac{3}{4} = \frac{3+5-6}{8} = \frac{2}{8} = \frac{1}{4}$$

$$\therefore P(A/B) = \frac{P(A \cap B)}{P(B)} = \frac{1/4}{5/8} = \frac{8}{20} = \frac{2}{5}$$

$$\text{and } P(A'/B) = \frac{P(A' \cap B)}{P(B)} = \frac{P(B) - P(A \cap B)}{P(B)}$$

$$= \frac{\frac{5}{8} - \frac{1}{4}}{\frac{5}{8}} = \frac{\frac{5-2}{8}}{\frac{5}{8}} = \frac{3}{5}$$

$$\therefore P(A/B) \cdot P(A'/B) = \frac{2}{5} \cdot \frac{3}{5} = \frac{6}{25}$$