

Question 4:

Evaluate $P(A \cup B)$, if $2P(A) = P(B) = \frac{5}{13}$ and $P(A|B) = \frac{2}{5}$.

Solution:

$$\text{Given, } 2P(A) = P(B) = \frac{5}{13}$$

$$\Rightarrow P(A) = \frac{5}{26} \text{ and } P(B) = \frac{5}{13}$$

$$\Rightarrow P(A|B) = \frac{2}{5}$$

$$\Rightarrow \frac{P(A \cap B)}{P(B)} = \frac{2}{5}$$

$$\begin{aligned} \Rightarrow P(A \cap B) &= \frac{2}{5} \times \frac{5}{13} \\ &= \frac{2}{13} \end{aligned}$$