

⑧

Given, $P(A) = \frac{2}{5}$, $P(B) = \frac{1}{3}$ and $P(C) = \frac{1}{2}$.

$$P(A \cap C) = \frac{1}{5} \text{ and } P(B \cap C) = \frac{1}{4}.$$

$$P(C|B) = \frac{P(B \cap C)}{P(B)} = \frac{1/4}{1/3} = \frac{3}{4}.$$

$$\begin{aligned} P(\bar{A} \cap \bar{C}) &= 1 - P(A \cup C) \\ &= 1 - [P(A) + P(C) - P(A \cap C)] \\ &= 1 - \left[\frac{2}{5} + \frac{1}{2} - \frac{1}{5} \right] \\ &= 1 - \left[\frac{7}{10} \right] = \frac{3}{10}. \end{aligned}$$