Probability Assignment

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12.13.1.3

If $P(A) = 0.8$, $P(B) = 0.5$, and $P(A \cap B) = 0.32$, find:

(i) $P(A)$

(ii) $P(A|B)$

(iii) $P(A \cup B)$

Solution:

(i) Given, $P(A) = 0.8$

We know that $P(B|A) = \dfrac{P(B \cap A)}{P(A)}$

$$\Rightarrow 0.4 = \frac{P(B \cap A)}{0.8}$$

$$\Rightarrow \mathbf{P(B \cap A) = 0.32}$$

(ii) Similarly, $P(A|B) = \dfrac{P(A \cap B)}{P(B)}$

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

$$\Rightarrow \mathbf{P(A|B)} = \frac{0.32}{0.5} = \mathbf{0.64}$$

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

$$\Rightarrow \mathbf{P(A \cup B)} = 0.8 + 0.5 - 0.32 = \mathbf{0.98}$$