

Probability Assignment 1

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QUESTION :

(iv) $\Pr(\text{neither } A \text{ nor } B)$

Given two independent events A and B such that
 $\Pr(A) = 0.3$, $\Pr(B) = 0.6$. Find

$$\Pr(\text{neither } A \text{ nor } B) = \Pr(A'B') \quad (6)$$

$$\text{As, } A'B' = (A + B)' \quad (7)$$

$$\Pr(\text{neither } A \text{ nor } B) = \Pr(A') \times \Pr(B') \quad (8)$$

$$= (1 - 0.3) \times (1 - 0.6)$$

$$= 0.28$$

(i) $\Pr(A \text{ and } B)$

(ii) $\Pr(A \text{ and not } B)$

(iii) $\Pr(A \text{ or } B)$

(iv) $\Pr(\text{neither } A \text{ nor } B)$

SOLUTION :

Given $\Pr(A) = 0.3$, $\Pr(B) = 0.6$.

(i) $\Pr(A \text{ and } B)$

As A and B are independent events.

$$\Pr(A \text{ and } B) = \Pr(AB) = \Pr(A) \times \Pr(B) \quad (1)$$

$$= 0.3 \times 0.6$$

$$= 0.18$$

(ii) $\Pr(A \text{ and not } B)$

$$\Pr(A \text{ and not } B) = \Pr(AB') \quad (2)$$

$$= 0.3 \times (1 - 0.6)$$

$$= 0.12$$

(iii) $\Pr(A \text{ or } B)$

$$\Pr(A \text{ or } B) = \Pr(A + B) \quad (3)$$

$$(4)$$

As we know,

$$\Pr(A + B) = \Pr(AB') + \Pr(A'B) + \Pr(AB) \quad (5)$$

$$(5)$$

$$\Pr(A + B) = (0.3) \times (1 - 0.6) + (1 - 0.3)(0.6) + (0.3)(0.6)$$

$$\Pr(A + B) = 0.72$$