Probability Assignment 1

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

- 1) Pr(AB)
- 2) Pr(AB')
- 3) Pr(A + B)
- 4) Pr(A'B')

Solution : Given Pr(A) = 0.3, Pr(B) = 0.6.

1) Pr(AB): As A and B are independent events.

$$\Rightarrow \Pr(AB) = \Pr(A) \times \Pr(B) \qquad (1)$$

$$= 0.3 \times 0.6$$

$$= 0.18$$

2) Pr(AB'): We know that,

$$B + B' = 1 \tag{2}$$

Hence,

$$\implies \Pr(B + B') = 1 \tag{3}$$

$$\implies \Pr(B) + \Pr(B') = 1$$
 (4)

$$\Rightarrow \Pr(B') = 1 - \Pr(B)$$

$$= 1 - 0.6$$

$$= 0.4$$
(5)

Since A and B are independent,

$$\Rightarrow \Pr(AB') = \Pr(A) \times \Pr(B') \qquad (6)$$
$$= 0.3 \times 0.4$$
$$= 0.12$$

3) Pr(A + B): As we know,

$$Pr(A + B) = Pr(A) + Pr(B) - Pr(AB)$$
(7)
= 0.3 + 0.6 - 0.18
= 0.72

4) Pr(A'B'): As we know,

$$A'B' = (A+B)' \tag{8}$$

Therefore,

$$\Rightarrow \Pr(A'B') = \Pr((A+B)')$$

$$= 1 - \Pr(A+B)$$

$$= 1 - 0.72$$

$$= 0.28$$
(9)