AI1110
Assignment 3

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Outline

CBSE class 11 Exercise 16.3 Problem 12

Check whether the following probabilities $\Pr(A)$ and $\Pr(B)$ are consistently defined.

(a) $\Pr(A) = 0.5$, $\Pr(B) = 0.7$, $\Pr(AB) = 0.6$.

(b) $\Pr(A) = 0.5$, $\Pr(B) = 0.4$, $\Pr(A + B) = 0.8$.

Solution

Condition,
$\Pr(X)$ and $\Pr(Y)$ are consistently defined if :

$$\Pr(XY) < \Pr(X)$$

and

$$\Pr(XY) < \Pr(Y)$$

(i), $\Pr(A) = 0.5$, $\Pr(B) = 0.7$, $\Pr(AB) = 0.6$

$$\Pr(AB) > \Pr(A)$$

$\therefore$ the given probabilities aren't consistently defined.

Solution

(ii), $\Pr(A) = 0.5$,$\Pr(B) = 0.4$, $\Pr(A+B) = 0.8$.

As we know,

$$\begin{aligned}\Pr(A+B) &= \Pr(A) + \Pr(B) - \Pr(AB)\\ 0.8 &= 0.5 + 0.4 - \Pr(AB)\\ \Pr(AB) &= 0.9 - 0.8 = 0.1.\end{aligned}$$

Solution

$$\Pr(AB) = 0.1 \tag{1}$$

By (1) we can say that,

$$\Pr(AB) < \Pr(A)$$
$$\Pr(AB) < \Pr(B)$$

So, the given probabilities are consistently defined.