Question 11.16.3.35

The probability of an occurrence of event A is .7 and that of the occurrence of event B is .3 and the probability of occurrence of both is .4.Is this statement true or false?

Solution:

Given,

$$\Pr(A) = 0.7 \tag{1}$$

$$\Pr(B) = 0.3 \tag{2}$$

$$\Pr(AB) = 0.4 \tag{3}$$

Consider,

$$\Pr(AB) \leq \Pr(A) \times \Pr(B) \tag{4}$$

$$\implies \Pr(AB) \leq 0.7 \times 0.3 \tag{5}$$

$$\implies \Pr(AB) \leq 0.21 \tag{6}$$

But given that $\Pr(AB) = 0.4 > 0.21$

$\therefore$ The given statement is false.