**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,

$$\Pr(A|B) = \frac{\Pr(AB)}{\Pr(B)} \tag{4}$$

Now, we know that

$$0 \leq \frac{\Pr(AB)}{\Pr(B)} \leq 1 \tag{5}$$

Since, probabilities are always between 0 and 1.

$$0 \leq \frac{0.4}{0.3} \leq 1 \tag{6}$$

$$0 \leq 0.4 \leq 0.3 \tag{7}$$

But given that $0.4 > 0.3$

$\therefore \Pr(AB) \neq 0.4$

The given statement is false.