# Solution to question 11.16.3.34

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Question: Prove if the given statement is true or false - The probability of intersection of two events A and B is always less than or equal to those favourable to the event A.

**Solution:** We have to prove that:

$$\Pr(AB) \leq \Pr(A) \tag{1}$$

If we consider conditional probability:

$$\Pr(B|A) = \frac{\Pr(AB)}{\Pr(A)} \tag{2}$$

$$\Pr(AB) = \Pr(B|A)\Pr(A) \tag{3}$$

We know that the value of probability ranges from 0 to 1.

$$0 \leq \Pr(B|A) \leq 1 \tag{4}$$

Multiplying $\Pr(A)$ both sides

$$0 \leq \Pr(B|A)\Pr(A) \leq \Pr(A) \tag{5}$$

Substituting value from equation (3)

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

Hence, the given statement is true.