

# Assignment6

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# Abstract

This document contains 6<sup>th</sup> problem from exercise 2 of CBSE Class 12 (Probability) .

# Problem

**Exercise 2 Problem 3** Let  $E$  and  $F$  be events with  $P(E) = \frac{3}{5}$ ,  $P(F) = \frac{3}{10}$  and  $P(EF) = \frac{1}{5}$ . Are  $E$  and  $F$  independent?

# Theory

## Independent events :

Two events are independent if the incidence of one event does not affect the probability of the other event.(or)

Two events  $A, B$ (say) are said to be independent if  $P(A|B) = P(A)$

$$\implies P(A|B) = \frac{P(AB)}{P(B)} = P(A) \quad (1)$$

$$\implies P(A) \times P(B) = P(AB) \quad (2)$$

# Solution

Let's check whether the above events are independent or not.

$$P(A) \times P(B) = \frac{3}{5} \times \frac{3}{10} \quad (3)$$

$$\implies P(A) \times P(B) = \frac{9}{50} \quad (4)$$

From (4) it's clear that

$$P(AB) \neq P(A) \times P(B) \quad (5)$$

Which says that the events  $E$  and  $F$  are not independent.