

ASSIGNMENT-3 - CBSE-11 EX:16.3

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PROBLEM-18:

In Class XI of a school 40% of the students study Mathematics and 30% study Biology. 10% of the class study both Mathematics and Biology. If a student is selected at random from the class, find the probability that he will be studying Mathematics or Biology.

SOLUTION:

Let $X = \{0, 1\}$ be a random variable representing students studying mathematics and biology respectively.

Event	Description
$X = 0$	Students studying mathematics
$X = 1$	Students studying biology

Let's assume 'A' be the event that the student is studying mathematics and 'B' be the event that the student is studying biology. so,

$$\Pr(X = 0) = \frac{40}{100} = \frac{2}{5} \quad (1)$$

$$\Pr(X = 1) = \frac{30}{100} = \frac{3}{10} \quad (2)$$

$$\text{then, } \Pr((X = 0)(X = 1)) = \frac{10}{100} \quad (3)$$

$\Rightarrow \frac{1}{10}$, probability of studying both mathematics and biology.

Here, probability of studying mathematics or biology will be given by $P(A \cup B)$

$$\therefore \Pr((A) + (B)) = \Pr(A) + \Pr(B) - \Pr(A) \Pr(B) \quad (4)$$

$$= (2/5) + (3/10) - (1/10) \quad (5)$$

$$= (6/10) \quad (6)$$

$$\boxed{= (3/5)} \quad (7)$$

Hence, (3/5) is the probability that student will be studying mathematics or biology.