



# Probability Assignment-II

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## I. PROBLEM

Given that the events  $A$  and  $B$  are such that  $\Pr(A) = \frac{1}{2}$ ,  $\Pr(A + B) = \frac{3}{5}$  and  $\Pr(B) = p$ . Find  $p$  if they are

- 1) mutually exclusive
- 2) independent

## II. SOLUTION

- 1) mutually exclusive

Given  $A$  and  $B$  are mutually exclusive events, then,

$$\Pr(A + B) = \Pr(A) + \Pr(B) \quad (1)$$

$$\frac{3}{5} = \frac{1}{2} + p \quad (2)$$

$$\therefore p = \frac{1}{10} \quad (3)$$

- 2) independent

Given  $A$  and  $B$  are independent events, then,

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

$$\Pr(A + B) = \Pr(A) + \Pr(B) - \Pr(A)\Pr(B) \quad (5)$$

$$\frac{3}{5} = \frac{1}{2} + p - \frac{p}{2} \quad (6)$$

$$\therefore p = \frac{1}{5} \quad (7)$$