AI1110 ASSIGNMENT-2

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Abstract—This document contains the solution for Assignment 1 (ICSE 12 2018, Question 1x)

I. QUESTION 1X

In a race, the probabilities of A and B winning the race are $\frac{1}{3}$ and $\frac{1}{6}$ respectively. Find the probability of neither of them winning the race ?

II. SOLUTION

Given,

$$P(A) = \frac{1}{3} \tag{1}$$

$$P(B) = \frac{1}{6} \tag{2}$$

We know that,
The Probability of two independent events A and B occurring simultaneously is given by the expression
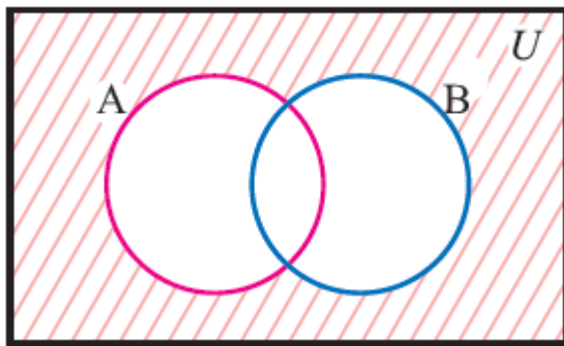
$$P(A \cap B) = P(A)(B) \tag{3}$$

Fig. 0. Venn diagram of $\bar{A} \cap \bar{B}$

From the above venn diagram, we can clearly see that,

$$P(\bar{A} \cap \bar{B}) = 1 - P(A) - P(B) + P(A \cap B) \tag{4}$$

(since, $P(A \cap B)$ is removed twice, we need to add it once)

Now putting (1), (2), (3) in (4), we get

$$P(\bar{A} \cap \bar{B}) = 1 - \frac{1}{3} - \frac{1}{6} + \frac{1}{3} \times \frac{1}{6} \tag{5}$$

$$P(\bar{A} \cap \bar{B}) = 1 - \frac{1}{3} - \frac{1}{6} + \frac{1}{18} \tag{6}$$

$$P(\bar{A} \cap \bar{B}) = 1 - \frac{8}{18} \tag{7}$$

$$P(\bar{A} \cap \bar{B}) = \frac{10}{18} \tag{8}$$

so, The probability of neither of them winning the race is $\frac{10}{18}$