

11.16.3.9

EE24BTECH11007 - Arnav Makarand Yadnopavit

Question: If $\frac{1}{12}$ is the probability of an event, what is the probability of the event 'not A'.

Solution:

Let us solve the problem using a random variable.

- Define a random variable X such that:

$$p_X(x) = \begin{cases} 1, & \text{if event } A \text{ occurs,} \\ 0, & \text{if event } A \text{ does not occur.} \end{cases}$$

- The probability of A occurring is given as $P(A) = \frac{1}{12}$. Therefore, $p_X(x) = P(A) = \frac{1}{12}$.
- The probability of the complement of A (denoted as "not A ") is $P(A')$, which is the probability of $p_X(0)$. Using the rule of complementary probabilities:

$$P(A') = 1 - P(A)$$

- Substitute $P(A) = \frac{1}{12}$ into the equation:

$$P(A') = 1 - \frac{1}{12}$$

- Simplify:

$$P(A') = \frac{12}{12} - \frac{1}{12} = \frac{11}{12}.$$

Thus, the probability of the event "not A " is:

$$P(A') = \frac{11}{12}.$$