

# 11.16.2.2.6

EE24BTECH11025 - GEEDI HARSHA

**Question:** A die is thrown. Describe the following event:

(a)  $F$ : a number not less than 3.

**Solution:**

A fair six-sided die has outcomes in the sample space:

$$S = \{1, 2, 3, 4, 5, 6\}. \quad (0.1)$$

The event  $F$  represents getting a number not less than 3, which means:

$$F = \{3, 4, 5, 6\}. \quad (0.2)$$

Since the die is fair, each face has an equal probability of occurring. The probability mass function (PMF) describes the probability of each outcome:

$$P(X = x) = \frac{1}{6}, \quad x \in \{1, 2, 3, 4, 5, 6\}. \quad (0.3)$$

The cumulative distribution function (CDF) gives the probability of rolling a number less than or equal to  $x$ :

$$P(X \leq x) = \sum_{k=1}^x P(X = k) = \frac{x}{6}, \quad x \in \{1, 2, 3, 4, 5, 6\}. \quad (0.4)$$

The probability of event  $F$  occurring is calculated as follows:

$$P(F) = \frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}. \quad (0.5)$$

$$= \frac{4}{6} = \frac{2}{3}. \quad (0.6)$$

Thus, the probability of rolling a number not less than 3 is  $\frac{2}{3}$ .

This means that in a large number of trials, about 66.67% of the rolls will yield a number between 3 and 6.

