

UNIT-III: Basics Of Probability

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Concept of Experiments

An experiment is a process that leads to the occurrence of one and only one of several possible observations. Examples include rolling a die and flipping a coin.

Sample Space

The set of all possible outcomes of an experiment. Denoted as 'S'.

Example: For a die roll, $S = \{1, 2, 3, 4, 5, 6\}$.

Event

A subset of the sample space that includes one or more outcomes of an experiment.

Example: Getting an even number when rolling a die (Event $A = \{2, 4, 6\}$).

Definition of Combinatorial Probability

Probability of an event A occurring is given by:

$P(A) = (\text{Number of favorable outcomes}) / (\text{Total number of outcomes})$

Example: Probability of rolling a 3 in a fair die = $1/6$.

Conditional Probability

The probability of event A occurring given that event B has already occurred is given by:

$P(A|B) = P(A \cap B) / P(B)$, provided $P(B) \neq 0$.

Bayes Theorem

Bayes' Theorem is used to determine the probability of an event based on prior knowledge of conditions related to the event.

Formula:

$P(A|B) = [P(B|A) * P(A)] / P(B)$.

