

Understanding Probability

Definition:

.Probability is a measure of the likelihood of an event occurring.

.It is expressed as a number between 0 and 1, where 0 represents impossibility and 1 represents certainty.

Sample Space and Events:

.The sample space (S) is the set of all possible outcomes of an experiment.

.An event (E) is a subset of the sample space, representing one or more outcomes of interest.

Basic Concepts

1. Probability of an Event:

.The probability of an event ($P(E)$) is the ratio of the number of favorable outcomes to the total number of outcomes in the sample space.

$$P(E) = \frac{\text{Number of Favorable Outcomes}}{\text{Total Number of Outcomes}}$$

2. Complement of an Event:

.The complement of an event (E') is the set of all outcomes not in the event E .

The probability of the complement of an event is given by: $P(E') = 1 - P(E)$

1. Addition Rule:

.The probability of the union of two events E and F is given

$$\text{by: } P(E \cup F) = P(E) + P(F) - P(E \cap F)$$

Where $P(E \cap F)$ represents the probability of the intersection of events E and F .

2. Multiplication Rule

The probability of the intersection of two independent

.events E and F is given by: $P(E \cap F) = P(E) \times P(F)$ If E and F are dependent events, the multiplication rule is modified accordingly.

Applications

1. Coin Tossing:

.Probability concepts are often illustrated using simple experiments like tossing a fair coin, where the outcomes are heads or tails.

2. Dice Rolling:

.Rolling a fair six-sided die is another common example used to demonstrate probability principles, with outcomes ranging from 1 to 6.