

Probability

- Some of the terms related to probability are:

Experiment: When an operation is planned and done under controlled conditions, it is known as an experiment. For example, tossing a coin, throwing a die etc., are all experiments.

- **Outcomes:** Different results obtained in an experiment are known as outcomes. For example, on tossing a coin, if the result is a head, then the outcome is a head; if the result is a tail, then the outcome is a tail.
- **Random:** An experiment is random if it is done without any conscious decision. For example, drawing a card from a well-shuffled pack of playing cards is a random experiment if it is done without seeing the card.
- **Trial:** A trial is an action or an experiment that results in one or several outcomes. For example, if a coin is tossed five times, then each toss of the coin is called a trial.
- **Sample space:** The set of all possible outcomes of an experiment is called the sample space. It is denoted by the letter 'S'. Sample space in the experiment of tossing a coin is {H, T}.
- **Event:** The event of an experiment is one or more outcomes of the experiment. For example, tossing a coin and getting a head or a tail is an event.

- **Probability:**

- The empirical (or experimental) probability of an event A is given by

$$P(A) = \frac{\text{Number of trials in which event A has occurred}}{\text{Total number of trials}}$$

Example: When a coin is tossed 500 times and on the upper face of the coin tail comes up 280 times. What is the probability of getting head on the upper face of the coin?

Solution: Let A be the event of getting head on the upper face of the coin.

Total number of trials = 500

Number of trials in which tail comes up = 280

Number of trials in which head comes up = 500 - 280 = 220

$$\therefore P(A) = \frac{220}{500} = \frac{11}{25}$$

- The probability of an event always lies between 0 and 1 (0 and 1 inclusive).