# Probability

## Understanding Notes

- Probability is the measure of how likely an event is to occur.
- The probability of any event lies between 0 and 1.
- An event that is impossible has a probability of 0 and an event that is certain has a probability of 1.
- Formula for probability:
- Probability of an event = Number of favorable outcomes / Total number of outcomes
- Probability helps to predict the chance of occurrence of events like tossing a coin, rolling a die, or drawing a card.
- The sum of probabilities of all possible outcomes in an experiment is always 1.

## Different Types of Examples with Solutions

### Example:

**Tossing a Coin**

What is the probability of getting a head when a coin is tossed?

**Solution:**

- Total outcomes = 2 (Head, Tail)
- Favorable outcomes = 1 (Head)
- Probability = $\frac{1}{2}$

### Example:

**Rolling a Die**

Find the probability of getting a number greater than 4 when a die is rolled.

**Solution:**

- Numbers on a die: 1, 2, 3, 4, 5, 6
- Numbers greater than 4 are 5 and 6 (2 numbers)
- Total outcomes = 6
- Probability = $\frac{2}{6} = \frac{1}{3}$

### Example:

**Drawing a Card**

A card is drawn from a deck of 52 cards. What is the probability of getting a king?

Solution:

- Number of kings = 4
- Total cards = 52
- Probability = $\frac{4}{52} = \frac{1}{13}$

### Example:

**Picking a Ball**

A bag contains 3 red balls, 5 green balls, and 2 blue balls. Find the probability of picking a green ball.

**Solution:**

- Total balls = 3 + 5 + 2 = 10
- Green balls = 5
- Probability = $\frac{5}{10} = \frac{1}{2}$

### Example:

**Probability of an Impossible Event**

Find the probability of getting a number greater than 6 on a standard die.

**Solution:**

- Numbers on a die are 1 to 6, no number greater than 6
- Favorable outcomes = 0
- Total outcomes = 6
- Probability = $\frac{0}{6} = 0$

## Summary Points

- Probability tells us how likely an event is to happen.
- Probability values are always between 0 and 1.
- Probability = $\frac{Favorable\ outcomes}{Total\ outcomes}$.
- The total probability of all possible outcomes is 1.
- An impossible event has probability 0 and a sure event has probability 1.