Topics

1. Basic Terminology
2. Types of Probability
   - 2.1 Theoretical Probability
3. Types of Events
4. Important Formulae
1. Basic Terminology

Random Experiment

❖ Has more than one possible outcomes.
❖ It is impossible to predict any outcome in advance.
❖ Examples:
   - Tossing a coin
   - Rolling a dice
   - Drawing a card from a well-shuffled deck

Outcome

❖ A possible result of an experiment or a trial.
❖ Examples:
   - Six outcomes for rolling a dice: 1, 2, 3, 4, 5, 6
   - Two outcomes for coin toss: Heads, Tails

Event

❖ A set of one or more outcomes for a random experiment.
❖ Example:
   - Getting a tail when a coin is tossed.
   - Getting an odd number when a dice is rolled.
2. Types of Probability

Types of Probability

Experimental Probability

Theoretical Probability

2.1 Theoretical Probability

\[ P(E) = \frac{\text{Number of favourable outcomes}}{\text{Total number of possible outcomes}} \]

When a coin is tossed:

- The probability of getting a head is \( \frac{1}{2} \)
- The probability of getting a tail is \( \frac{1}{2} \)

The probability \( P(E) \) of an event will be a number such that,

\[ 0 \leq P(E) \leq 1 \]
3. Types of Events

**Elementary Event**
- Has as only one outcome.
- Sum of all the elementary events for an experiment $= 1$

**Equally likely Event**
- When all the outcomes of an experiment have the same chance of occurring.
- Example: Tossing a coin

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**Impossible Event**
- $P(E) = 0$.
- Example: Getting a 7 when rolling a die

**Sure/Certain Event**
- $P(E) = 1$.
- Example: Christmas being celebrated on the 25th of December
3. Types of Events

**Complementary Events**

- IF $E$ denotes happening of an event, then $\overline{E}$ denotes NOT happening of that event.
- $E$ and $\overline{E}$ are said to be complementary events.
- $\overline{E}$ is the complement of $E$.

$$P(\overline{E}) = 1 - P(E)$$

For an event of getting a number less than four on rolling a dice:

<table>
<thead>
<tr>
<th>$E$</th>
<th>$\overline{E}$</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Dice" /></td>
<td><img src="image2.png" alt="Dice" /></td>
</tr>
</tbody>
</table>
4. Important Formulae

**Theoretical Probability**

\[ P(E) = \frac{\text{Number of favourable outcomes}}{\text{Total number of possible outcomes}} \]

**Probability of an event**

\[ 0 \leq P(E) \leq 1 \]

**For two complementary events, \( E \) and \( \bar{E} \),**

\[ P(\bar{E}) = 1 - P(E) \]
**Probability**

- **Theoretical Probability**
- **Experimental Probability**

**Terminologies**

- Events
  - Elementary events
  - Sure/certain events
- Complementary events
  - Impossible events
- Outcomes
  - Random Experimental

**Equally likely events**