□ Class 11 Mathematics – Chapter: Probability

---

1. Introduction

- Probability measures the likelihood of an event occurring.
- It is a number between 0 and 1, inclusive.

---

2. Experiment, Sample Space, and Events

- **Experiment:** A process with observable outcomes.
- **Sample Space (S):** Set of all possible outcomes.
- **Event:** A subset of the sample space.

---

3. Types of Events

- **Certain event:** Event that always happens (Probability = 1).
- **Impossible event:** Event that never happens (Probability = 0).
- **Elementary event:** Single outcome event.

- **Compound event:** Combination of outcomes.

---

4. Classical Definition of Probability

P(E)=Number of favorable outcomesTotal number of outcomesP(E) = \frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}
P(E)=Total number of outcomesNumber of favorable outcomes

---

5. Properties of Probability

- 0≤P(E)≤10 \leq P(E) \leq 10≤P(E)≤1
- P(S)=1P(S) = 1P(S)=1
- P(empty set)=0P(\text{empty set}) = 0P(empty set)=0
- P(E')=1−P(E)P(E') = 1 - P(E)P(E')=1−P(E), where E'E'E' is the complement of EEE.

---

6. Addition Rule

- For two events EEE and FFF:

P(E∪F)=P(E)+P(F)−P(E∩F)P(E \cup F) = P(E) + P(F) - P(E \cap F)P(E∪F)=P(E)+P(F)−P(E∩F)

---

7. Multiplication Rule

- For independent events EEE and FFF:

P(E∩F)=P(E)×P(F)P(E\cap F) = P(E) \times P(F)P(E∩F)=P(E)×P(F)

---

8. Examples

- Tossing coins, rolling dice, drawing cards.
- Probability of getting heads in a coin toss = 12\frac{1}{2}21.

---

9. Applications

- Games of chance.
- Risk assessment.
- Decision making under uncertainty.

---

10. Exam Tips

- Understand and memorize formulas.
- Practice problems involving sample spaces and events.
- Use Venn diagrams for combined events.
- Carefully distinguish between independent and dependent events.