

Probability

CBSE Class 11 Maths · Knowledge organiser

KEY DEFINITIONS

Sample space

The set of all possible outcomes of a random experiment.

Mutually exclusive events

Events that cannot happen together: $A \cap B = \emptyset$.

Exhaustive events

Events that together cover the whole sample space.

KEY FORMULAS

Axioms: $P(E) \geq 0$

, $P(S) = 1$,

additive for mutually exclusive events $P(\text{not } A) = 1 - P(A)$

Addition rule $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

A but not B ; neither $P(A) - P(A \cap B)$; $1 - P(A \cup B)$

YOU SHOULD BE ABLE TO...

- Write sample spaces, describe 'not', 'and' and 'or' events and use $P(\text{not } A) = 1 - P(A)$.
- Use the addition rule, test assignments against the axioms and count with combinations.
- Solve multi-part problems with dice, cards, committees and survey data.
- Combine mutually exclusive cases and complements in less direct questions.

WORKED EXAMPLE

Two dice are thrown. Find $P(\text{sum} = 5)$.

$$(1, 4), (2, 3), (3, 2), (4, 1): \frac{4}{36} = \frac{1}{9}.$$

COMMON MISTAKES

- ✗ Adding $P(A) + P(B)$ for events that can happen together (the overlap is counted twice).
- ✗ Listing unordered outcomes for two dice, which are not equally likely.
- ✗ Assigning probabilities that are negative or do not add up to 1.
- ✗ Confusing "mutually exclusive" (cannot both happen) with "exhaustive" (between them cover everything).