

Inferential Statistics & Hypothesis Testing

1. Permutation:

- Order matters.
- Without repetition

Total number of Possibilities = $n!$

Where n = no. of objects

- The number of permutations of n objects taken r at a time is determined by the following formula:
Here permutation applied bcz wants first 2.

→ When 4 players & want only first two then no. of possibilities are.

$$\frac{n!}{(n-r)!} = {}^n P_r = P\{n, r\}$$
$$\therefore \frac{4!}{(4-2)!} = \frac{4!}{2!} = \frac{4 \times 3 \times 2 \times 1}{2 \times 1} = 12$$

2. Combination:

- Order does not matter.
- As order matters in case of permutations, hence no. of choices is more there.
- Number of combinations of n objects taken r at a time is determined by the following formula:

→ Out of 4 bowlers available choose 3 to take in four matches.

$$\frac{n!}{(n-r)! \times r!}$$
$$\therefore \frac{4!}{(4-3)! \times 3!} = \frac{4 \times 3 \times 2 \times 1}{1 \times 3 \times 2 \times 1} = 4$$

NOTE:

- If question requires you to order /arrange a group of objects then **permutation**.
- If question requires you to pick/choose a group of objects then **combination**.

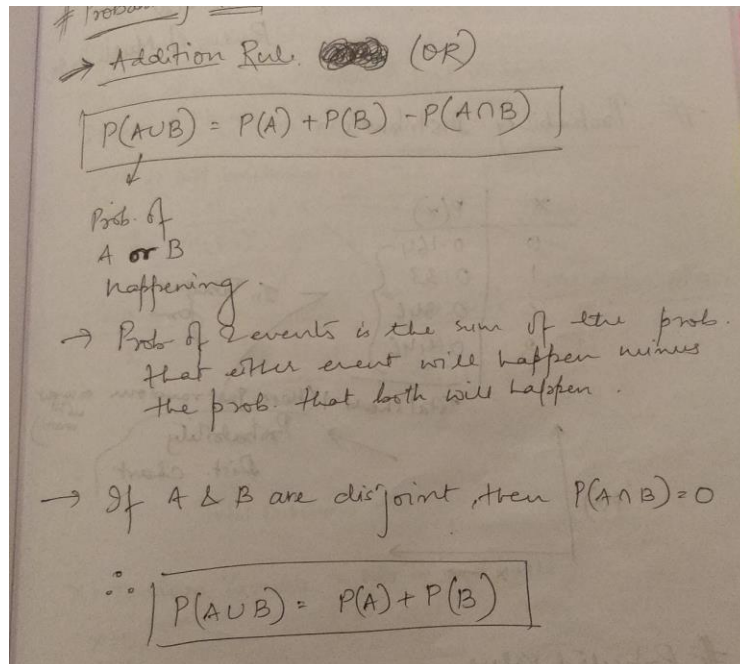
3. Probability:

- Predicts the likelihood of a future event.

$$P(x) = \text{No. of favourable outcomes} / \text{Total no. of outcomes}$$

- Properties of probability:
 - P(Single event) is always between 0 & 1.
 - Probability of all possible outcomes of an event = 1
- Key Terms:
 - Experiment (K)–
 - ✓ Deterministic – Outcome is always same and determined. Ex. P(sunrise)
 - ✓ Random – Many possible outcomes.
Ex. Coin toss
 - Sample Space(S) – Set of all possible outcomes for a given exp. K
 - Event – Subset of S for which outcome is true.
Types of events are:
 - ✓ Independent: Unrelated, if one event occurs, it does not give any info about the occurrence of the other.
 - ✓ Disjoint: Mutually exclusive, if one occurs then other cant.

- Probability Rule:
 - Addition Rule (OR)



- Multiplication Rule (AND)

