🎯 Title: Combination in Probability

◇ Slide 1: Introduction to Combination

What is Combination?

- Combination ka matlab hai:
  "Kuch cheezon ko chun-na, jahan order matter nahi karta."
- Probability mein combination ka use hota hai jab **order important nahi hota.**

Example:

- Agar 3 students A, B, C hain, aur humein 2 ka group banana ho
  - AB aur BA dono **same** group hain (is liye order matter nahi karta)

◇ Slide 2: Combination in Probability

Probability mein jab humein kisi event ke hone ke chances nikalne ho, jahan order matter nahi karta, tab Combination use hoti hai.

Example:

Box mein 5 red aur 3 blue balls hain. 2 balls random nikalni hain.
Kitne combinations possible hain?

Total balls = 8

$$C(8,2) = \frac{8!}{2! \cdot 6!} = \frac{40320}{2 \cdot 720} = 28 \text{ combinations}$$

◇ Slide 3: Combination Formula – Asaan Tareeqe Se

☑ Formula:

$$C(n, r) = \frac{n!}{r! \cdot (n - r)!}$$

📌 Jahan:

- **n** = Total items (jitni cheezein ya log available hain)
- **r** = Chune gaye items (jitni cheezein ya log aap select kar rahe hain)

☑ ! (Factorial) ka Matlab:

"Factorial" ka matlab hai kisi number ko us se chhoti saari counting numbers ke saath multiply karna.

Example:

- **4! = 4 × 3 × 2 × 1 = 24**
- **5! = 5 × 4 × 3 × 2 × 1 = 120**

☑ Example of Combination:

Agar 5 log hain (A, B, C, D, E), aur aapko in mein se 2 log chun-ne hain group banane ke liye (order matter nahi karta):

$$C(5, 2) = \frac{5!}{2! \cdot (5 - 2)!} = \frac{120}{2 \cdot 6} = \frac{120}{12} = 10$$

➤ Matlab: Aap 10 alag tareeqon se 2 log ka group bana sakte ho, jahan order matter nahi karta.

◇ Slide 4: Summary

- **Combination:** Jab order matter nahi karta
- Formula:

$$C(n,r) = \frac{n!}{r!(n-r)!}$$

- Probability mein use hoti hai jab sirf selection ka matter ho, **position ka nahi**
- Real-life examples: Teams, groups, lotteries, committees