

Permutations and Combinations

A Simple PPT Prepared for You

Introduction

- • Permutations and combinations are methods of counting.
- • They help us find how many ways objects can be arranged or selected.

Permutations

- • Order matters.
- • Formula: $nPr = n! / (n - r)!$
- • Example: Arrange 3 letters A, B, C \Rightarrow 6 ways.

Combinations

- • Order does NOT matter.
- • Formula: $nCr = n! / (r! (n - r)!)$
- • Example: Choose 2 fruits out of 3 \Rightarrow 3 ways.

Difference Between Permutation & Combination

- • Permutation \rightarrow Order matters.
- • Combination \rightarrow Order does not matter.
- • Example:
 - - AB and BA are different in permutation.
 - - AB and BA are same in combination.

Real-life Examples

- • Permutation: Password arrangements, seating arrangements.
- • Combination: Lottery numbers, team selection.

Circle, Point and Straight Line

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Applied Mathematics - 1

Point

- • A point represents an exact location in a plane.
- • It has no length, width or height.
- • Represented as (x, y) in coordinate geometry.
- Example: $(3, 5)$

Straight Line

- • A straight line is the shortest distance between two points.
- • It extends infinitely in both directions.
- • Slope-intercept form: $y = mx + c$
- • General form: $ax + by + c = 0$

Slope of a Line

- • Slope (m) shows how steep a line is.
- • Formula: $m = (y_2 - y_1) / (x_2 - x_1)$
- • If slope is positive \rightarrow line rises.
- • If slope is negative \rightarrow line falls.

Circle

- • A circle is a set of all points equidistant from a fixed point.
- • Center: (h, k)
- • Radius: r
- • Standard form equation: $(x - h)^2 + (y - k)^2 = r^2$

General Form of Circle

- • Equation: $x^2 + y^2 + 2gx + 2fy + c = 0$
- • Center = $(-g, -f)$
- • Radius = $\sqrt{g^2 + f^2 - c}$

Distance Formula

- Distance between two points:
- $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
- Used for radius, midpoint, and geometry problems.