Class 12 Mathematics - Chapter: Linear Programming

1. Introduction:

- Linear Programming is a method to achieve the best outcome (maximum or minimum) in a

mathematical model.

- It deals with the optimization (maximizing or minimizing) of a linear objective function, subject to

linear equality and inequality constraints.

2. Key Terminology:

- Constraints: Restrictions or limitations on the decision variables.

- Objective Function: The function to be optimized.

- Feasible Region: The region which satisfies all the constraints.

- Feasible Solution: Any point in the feasible region.

- Optimal Solution: A solution that optimizes the objective function.

3. Mathematical Formulation:

- Standard form:

Maximize/Minimize: Z = ax + by

Subject to:

$$a1x + b1y <= c1$$

$$a2x + b2y <= c2$$

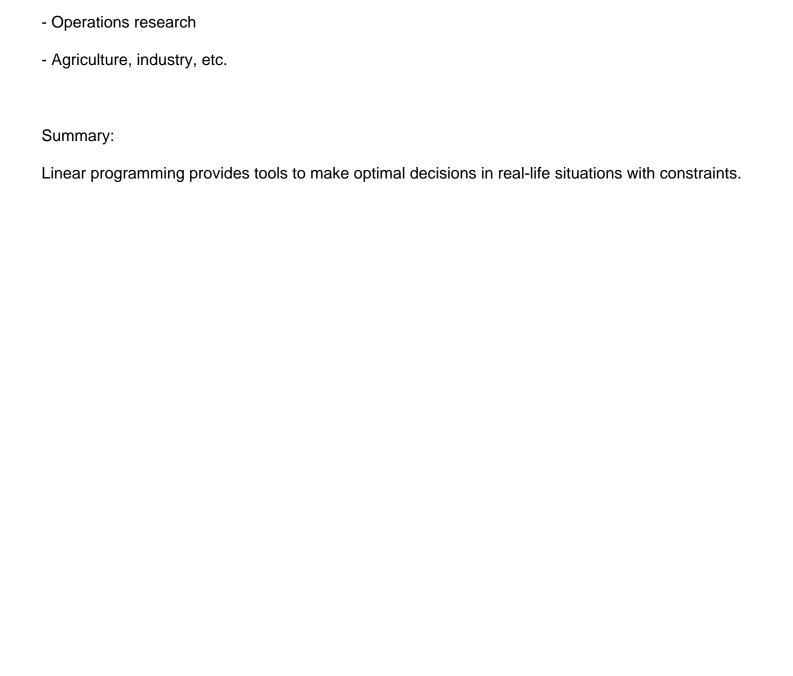
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$$x >= 0, y >= 0$$

4. Graphical Method:

- Used when there are two variables.

- Steps:
a. Plot all constraints as inequalities.
b. Identify the feasible region.
c. Find corner points of the feasible region.
d. Evaluate the objective function at each corner point.
e. The point with maximum/minimum value gives the optimal solution.
5. Types of Linear Programming Problems:
- Diet Problem
- Manufacturing Problem
- Transportation Problem
- Allocation Problem
6. Important Notes:
- Feasible region is always convex.
- If feasible region is bounded, optimal solution exists at a corner point.
- If two or more corner points yield the same optimal value, then there are infinitely many optimal
solutions.
7. Exam Tips:
- Always label graphs clearly.
- Use ruler and accurate scaling.
- Practice previous year questions.
- Show calculation for objective function at each corner point.
8. Applications:



- Business and economics