1. **Solve the following LP problem using graphical method.**

Maximize, $Z = 8x_1 + 8x_2$
Subject to, $12x_1 + 10x_2 <= 60$; $4x_1 + 4x_2 >= 80$; $x_1, x_2 >= 0$;

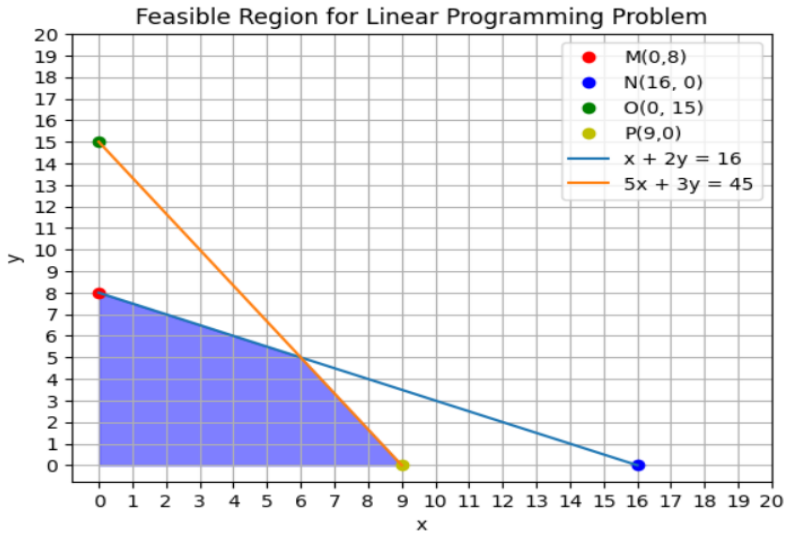
Objectives:

Apply the graphical method to solve linear programming problems and identify the feasible region.Verify intersection points and calculate the objective function values to find the optimal solution.

LAB work:

Identify the constraints: $12x_1 + 10x_2 <= 60$; $4x_1 + 4x_2 >= 80$; $x_1, x_2 >= 0$; Plot the lines :$12x_1 + 10x_2 = 60$, $4x_1 + 4x_2 = 80$ on a graph. Determine intersection points: (0, 6), (5, 0), (0, 20), (20, 0). Shade the feasible region where all constraints overlap using a distinct color.

Output:



Analysis and Results:

The graphing method accurately showed where solutions could exist, helping us understand the possible outcomes within the set limits. Solution, showing us how to achieve our goal under the given constraints.

2. Solve the following LP problem using graphical method.

Maximize, $Z = 8x_1 + 10x_2$;

Subject to, $20x_1 + 12x_2 <= 100$; $3x_1 + 5x_2 <= 120$; $x_1, x_2 >= 0$

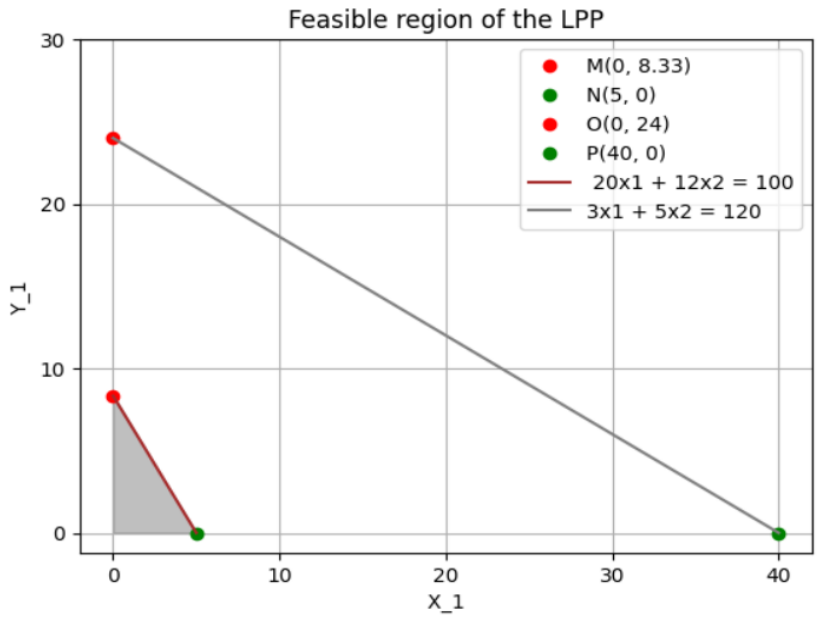
Objectives:

Use graphical representation to analyze the feasible region and understand constraints. Find the best solution to maximize the objective function by identifying the vertices.

LAB work:

Plotted the constraints $20x_1 + 12x_2 <= 100$; $3x_1 + 5x_2 <=120$ on the graph Determined the feasible region by shading the area where both constraints overlap. Determine intersection points: (0, 8.33), (5, 0), (0, 24), (40, 0). Shade the feasible region where all constraints overlap using a distinct color.

Output:



Analysis and Results:

The graphical method effectively illustrated the feasible region, providing insight into the feasible solutions within the specified constraints. By shading the overlapping area of the constraints, the optimal solution space was visually highlighted, aiding in understanding the feasible solutions and their boundaries.

3. **Solve the following LP problem using graphical method.**

Maximize, z = 2x + 5y;
Subject to, 8x + 2y >= 16; 5x + 3y <= 45 9x + 10y <= 90; x, y >= 0

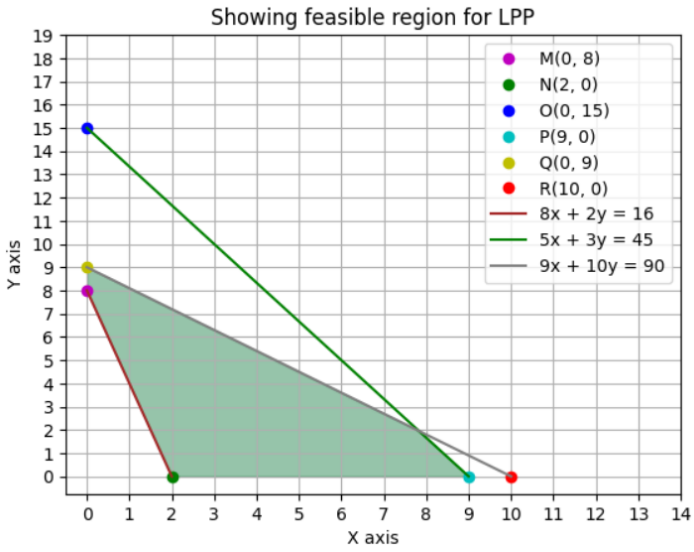
Objectives:

The lab introduces linear programming, focusing on optimizing linear objective functions with linear inequality constraints. Solving LP issues graphically to improve optimization and visualization abilities.

LAB work:

Plotted the constraints 8x + 2y >= 16; 5x + 3y <= 45; 9x + 10y <= 90 on the graph. Found the feasible region by shading the area where all constraints overlap and considering - y >= 0 Filled the feasible region where all constraints overlap using a distinct color for clarity. Added appropriate limits, labels, legend, title, and grid to the graph for better visualization.

Output:



Analysis and Results:

Feasible Region Analysis: The graphical method visually represented the area where all constraints were satisfied, showing the possible solutions.