

## Optimizing Methods

### Third List of Problems

1. For PP

$$f(x_1, x_2) = 2x_1 + 4x_2 + 6 \rightarrow \max$$

subject to:

$$x_1 + 3x_2 \leq 1, 5, \quad x_1 + 3x_2 \geq 9, \quad x_1 \geq 1, 5, \quad x_2 \geq 1, 5,$$

examine whether it is linear. Draw a feasible region for PP.

2. For LP given in matrix form:

$$\vec{x} \longrightarrow A\vec{x} \rightarrow \max, \text{ subject to } G\vec{x} \leq \vec{b}$$

and

$$A = \begin{bmatrix} 2 & 3 & 4 & 1 \end{bmatrix}, \quad \vec{x} = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix}, \quad G = \begin{bmatrix} 2 & 1 & 0 & 1 \\ 3 & 2 & 1 & 4 \end{bmatrix},$$
$$\vec{b} = \begin{bmatrix} 10 \\ 15 \end{bmatrix}, \quad \vec{x} \geq \vec{0},$$

give its analytical form.

3. Give a matrix form of LP given as below

$$12x_1 + 9x_2 + 16x_3 + 14x_4 \rightarrow \min,$$

subject to

$$4x_1 + 4x_3 + 5x_4 \geq 120,$$

$$2x_1 + 6x_2 + 4x_3 + 4x_4 \geq 180,$$

$$x_1, x_2, x_3, x_4 \geq 0.$$