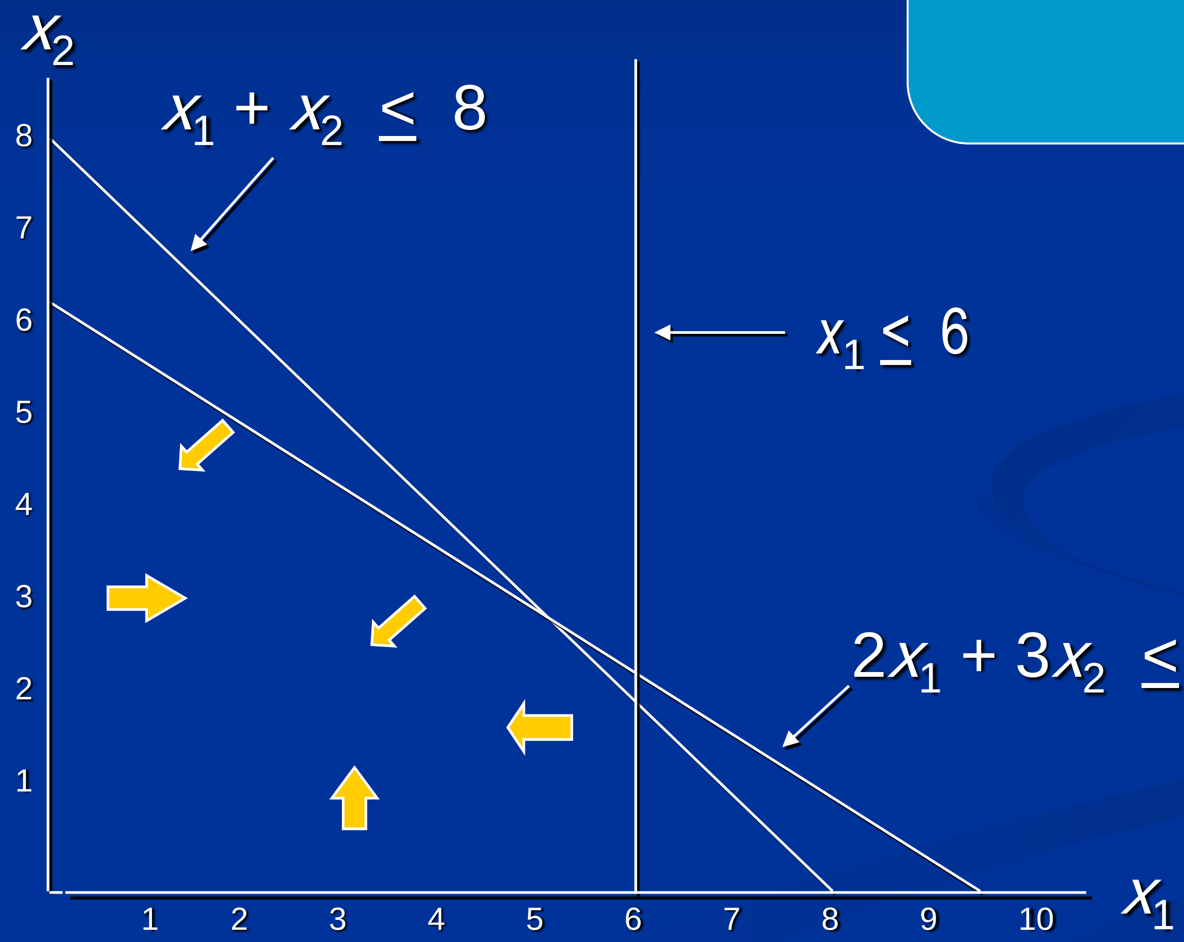
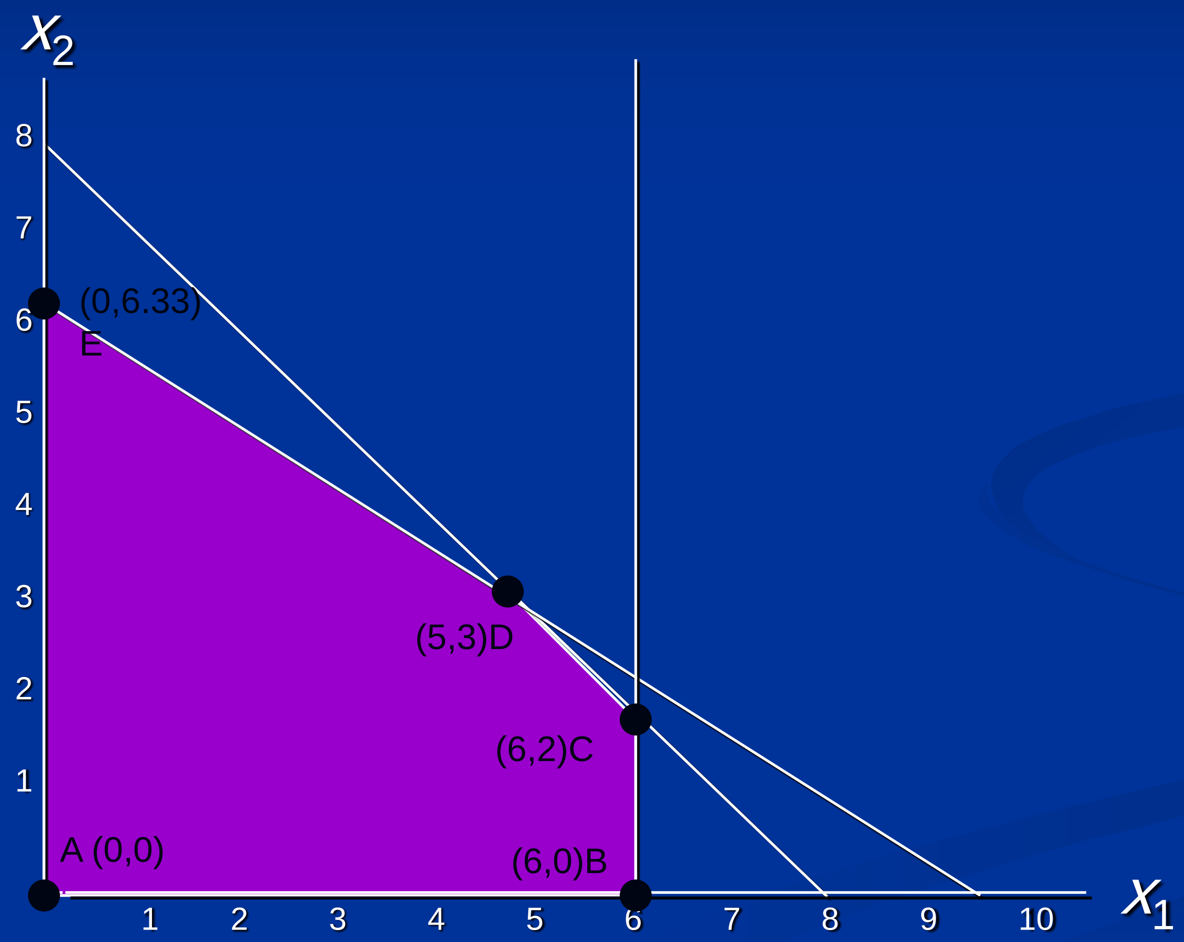
Example (Cont…)

$$\begin{aligned} \text{Max} \quad & z = 5x_1 + 7x_2 \\ \text{s.t.} \quad & x_1 \le 6 \\ & 2x_1 + 3x_2 \le 19 \\ & x_1 + x_2 \le 8 \\ & x_1, x_2 \ge 0 \end{aligned}$$



Example (Cont…)



Example (Cont…)

Objective Function : Max $Z = 5x_1 + 7x_2$

Corner Points	**Value of Z**
A – (0,0)	0
B – (6,0)	30
C – (6,2)	44
D – (5,3)	46
E – (0,6.33)	44.33

Optimal Point : (5,3)

Optimal Value : 46

Example

$$\text{Max} \quad Z = 3P1 + 5P2$$

$$\text{s.t.} \quad P1 \leq 4$$

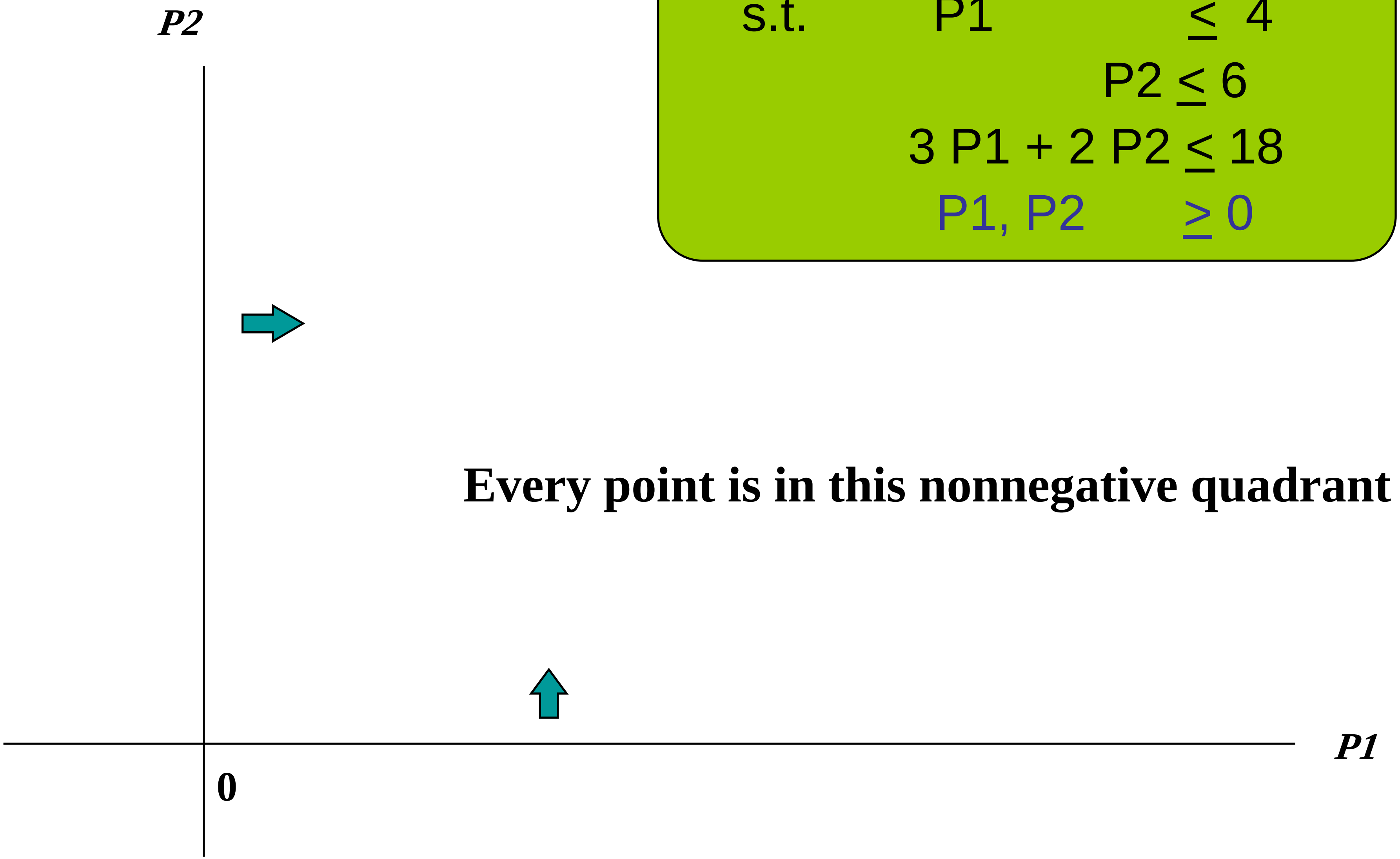
$$P2 \leq 6$$

$$3P1 + 2P2 \leq 18$$

$$P1, P2 \geq 0$$

Example

$$
\begin{aligned}
\text{Max} \quad & Z = 3P1 + 5P2 \\
\text{s.t.} \quad & P1 \le 4 \\
& P2 \le 6 \\
& 3P1 + 2P2 \le 18 \\
& P1, P2 \ge 0
\end{aligned}
$$



Example (Cont…)

Max $Z = 3P1 + 5P2$

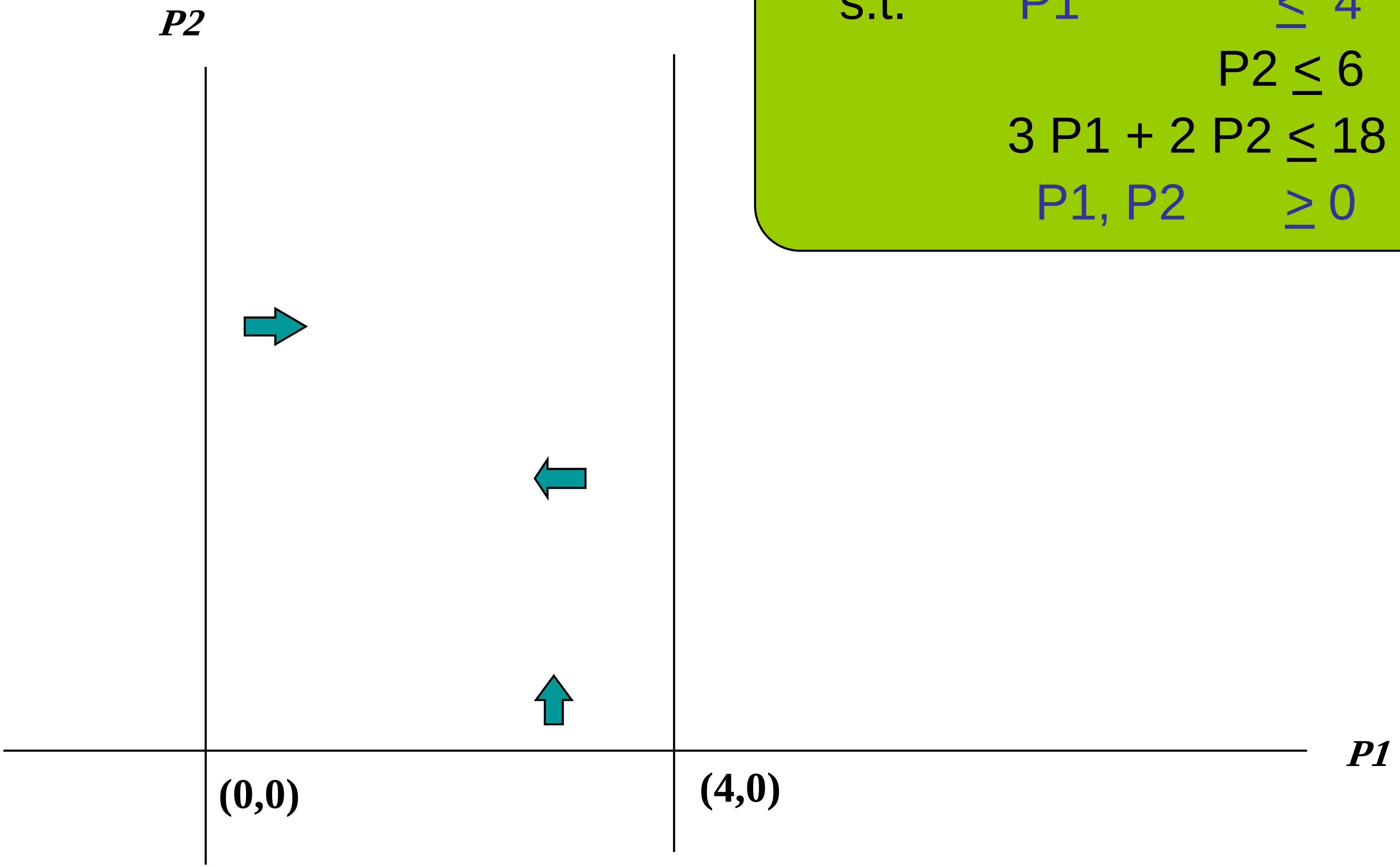
s.t.

$P1 \leq 4$

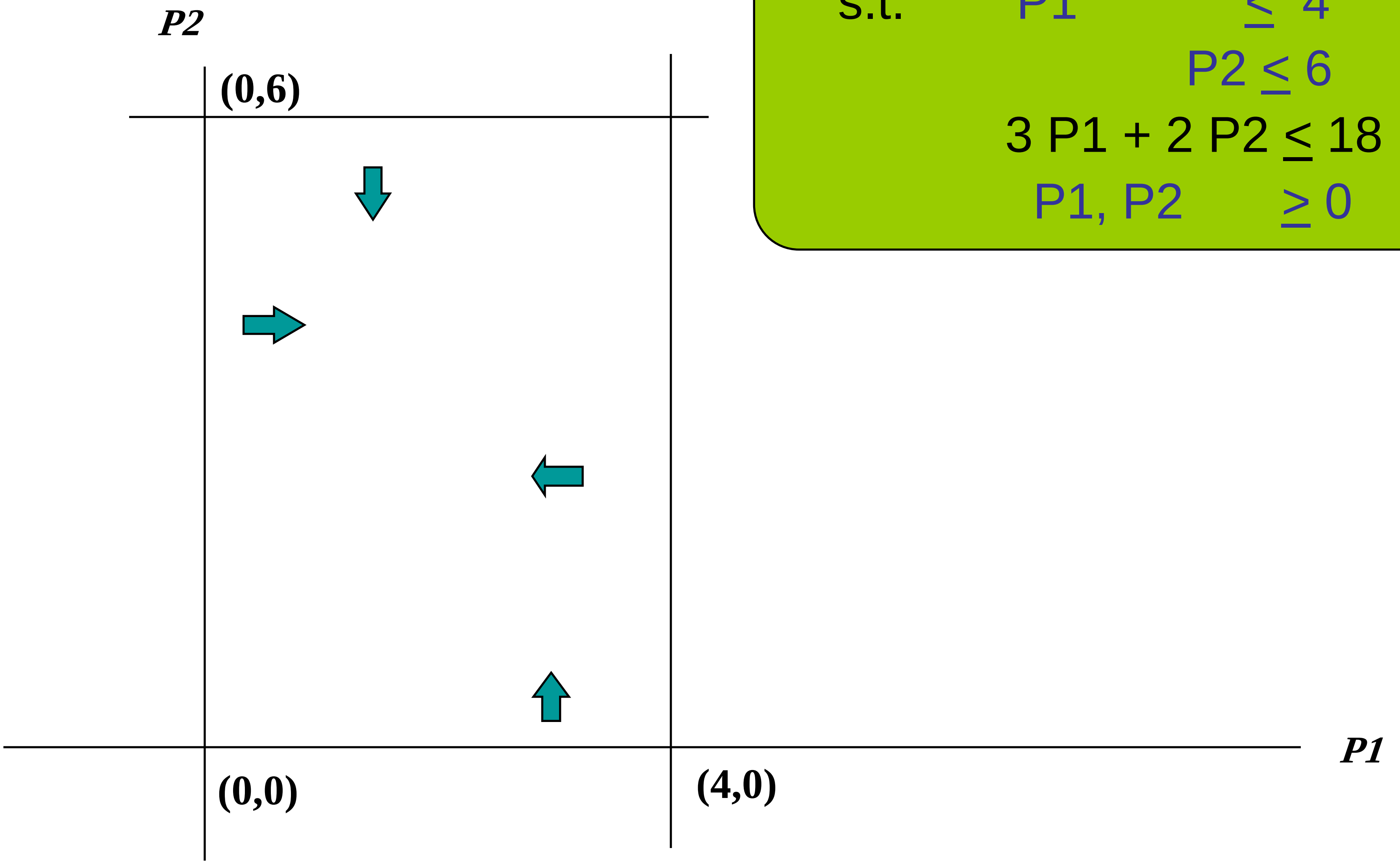
$P2 \leq 6$

$3P1 + 2P2 \leq 18$

$P1, P2 \geq 0$



Example (Cont…)



Max $Z = 3\,P1 + 5\,P2$

s.t.

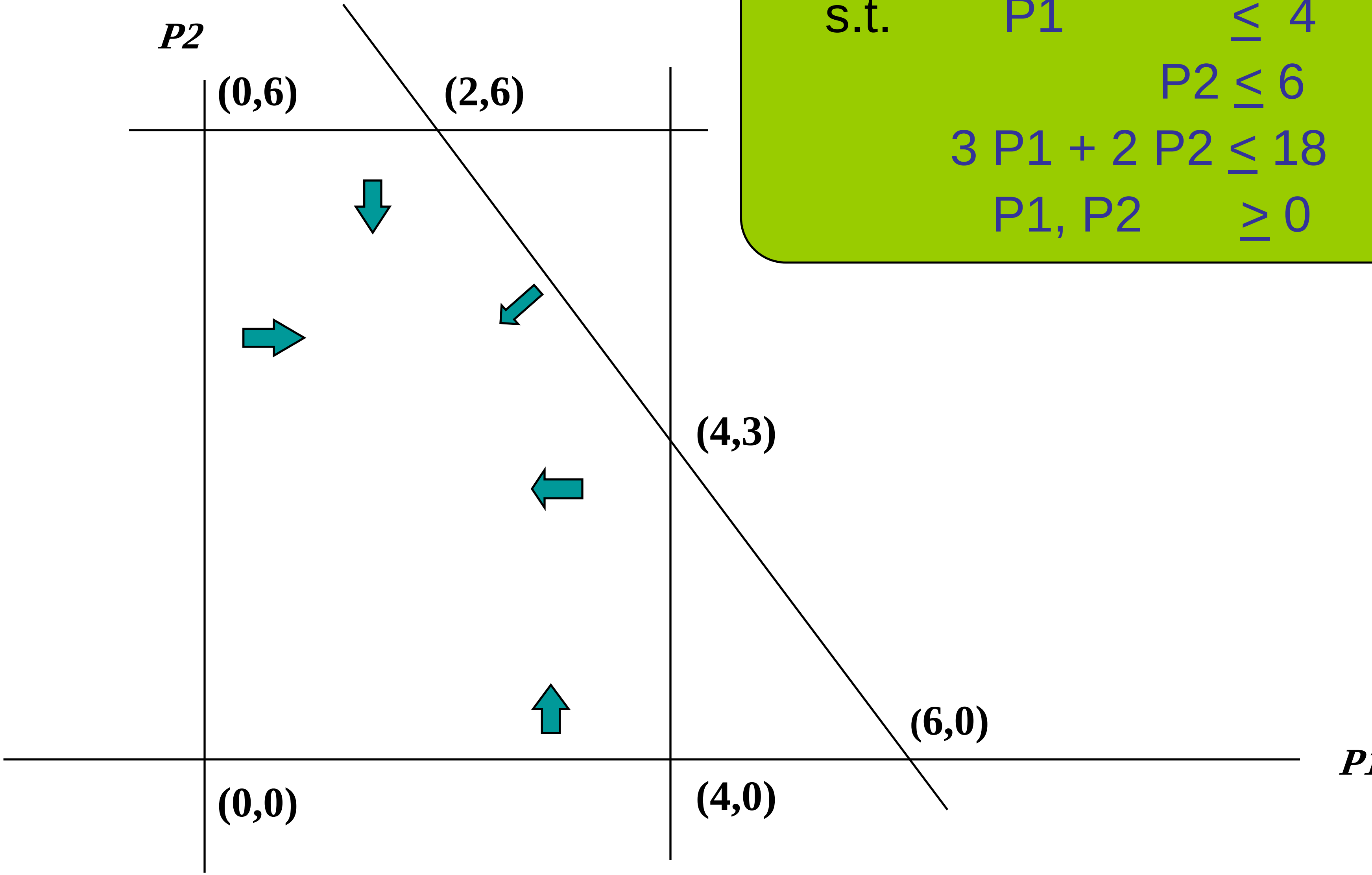
$P1 \leq 4$

$P2 \leq 6$

$3\,P1 + 2\,P2 \leq 18$

$P1, P2 \geq 0$

Example (Cont…)



Max Z= 3 P1 + 5 P2

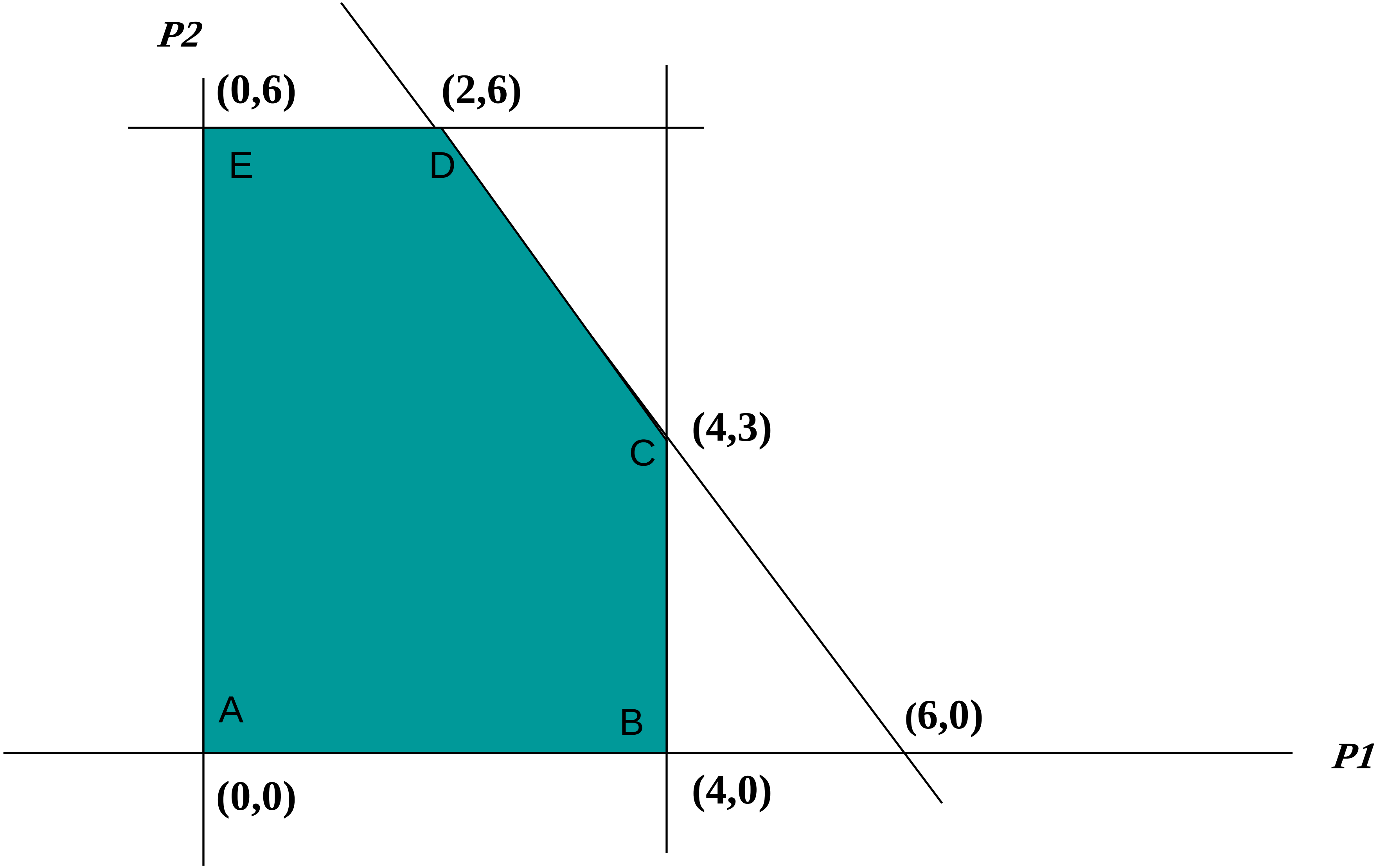
s.t. P1 $\leq$ 4

P2 $\leq$ 6

3 P1 + 2 P2 $\leq$ 18

P1, P2 $\geq$ 0

Example (Cont…)



Example (Cont…)

Objective Function : Max Z= 3 P1 + 5 P2

Corner Points	**Value of Z**
A – (0,0)	0
B – (4,0)	12
C – (4,3)	27
D – (2,6)	36
E – (0,6)	30

Optimal Point : (2,6)

Optimal Value : 36

Example

$$\text{Min} \quad z = 5x_1 + 2x_2$$

$$\text{s.t.} \quad 2x_1 + 5x_2 \geq 10$$

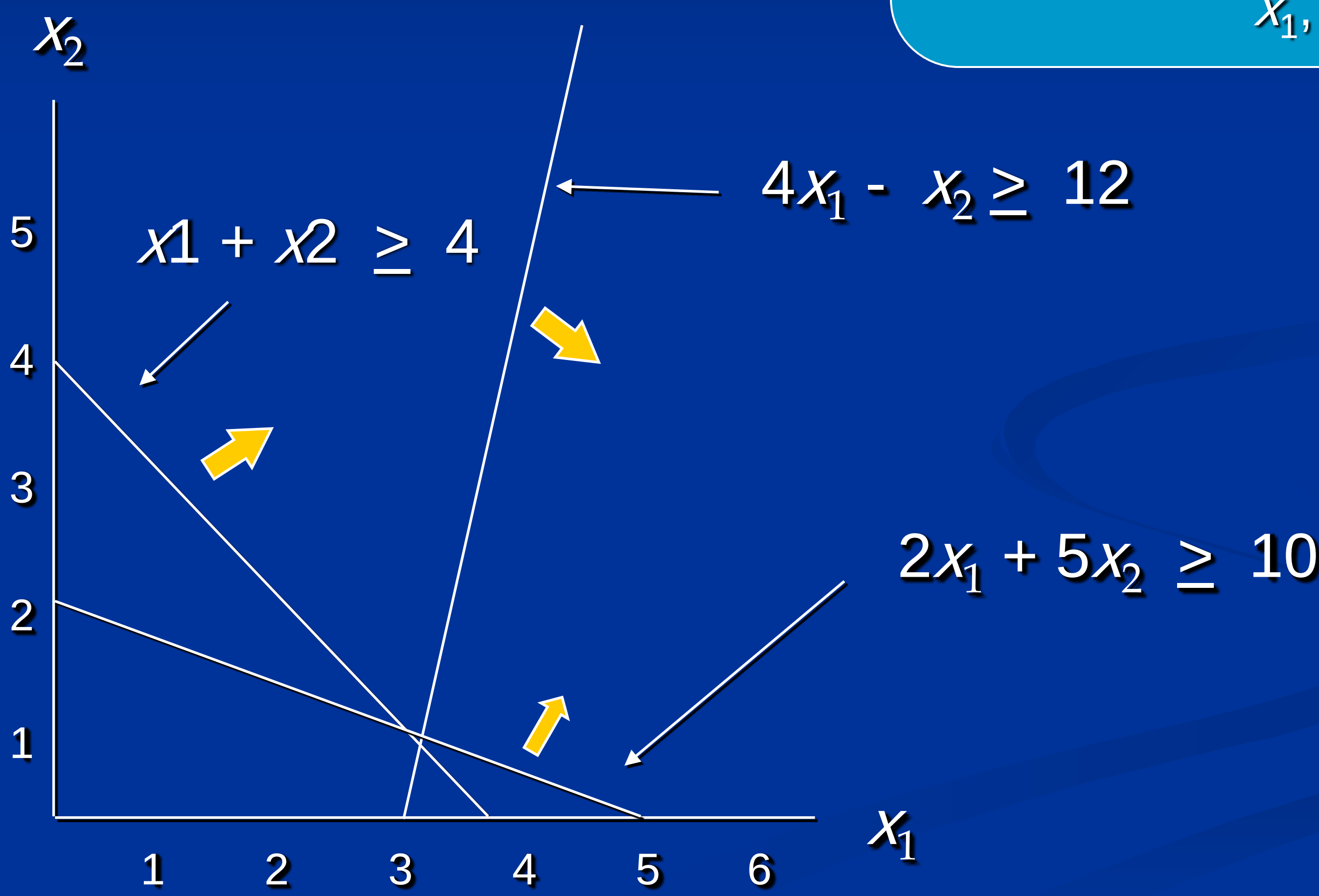
$$4x_1 - x_2 \geq 12$$

$$x_1 + x_2 \geq 4$$

$$x_1, x_2 \geq 0$$

Example

$$\begin{aligned} \text{Min} \quad & z = 5x_1 + 2x_2 \\ \text{s.t.} \quad & 2x_1 + 5x_2 \geq 10 \\ & 4x_1 - x_2 \geq 12 \\ & x_1 + x_2 \geq 4 \\ & x_1, x_2 \geq 0 \end{aligned}$$



Example (Cont…)

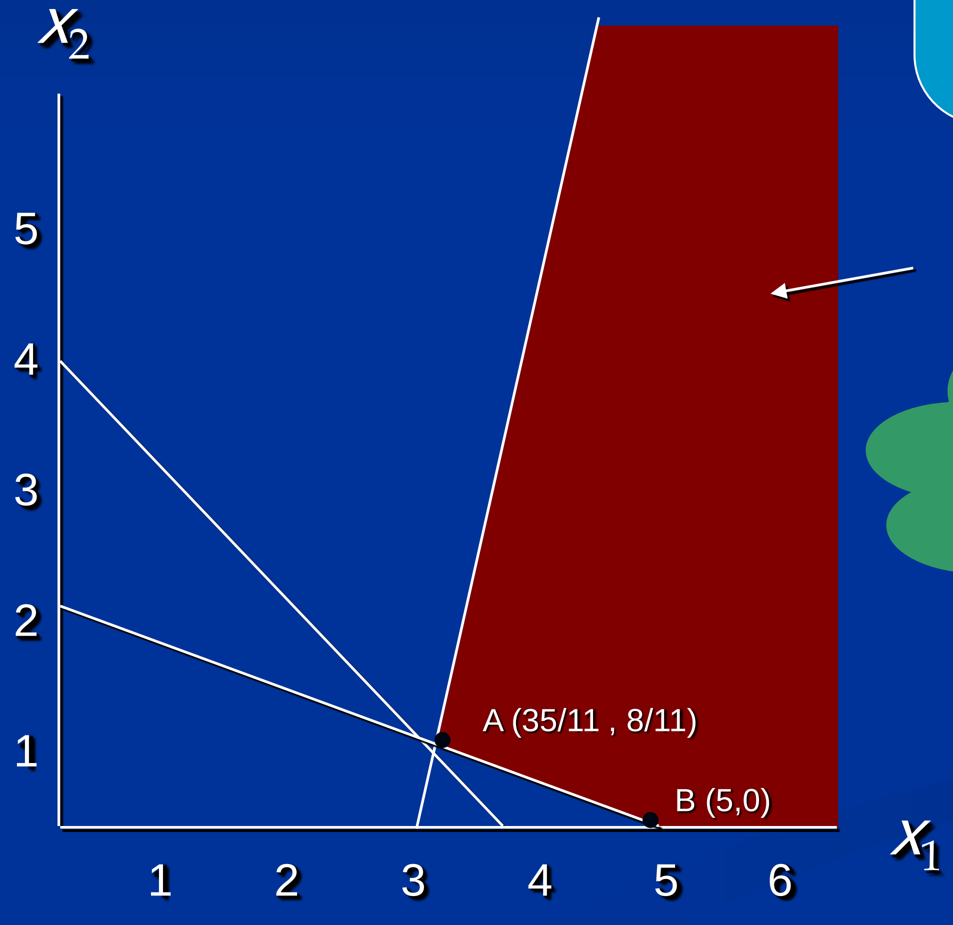
Min $z = 5x_1 + 2x_2$

s.t. $2x_1 + 5x_2 \geq 10$

$4x_1 - x_2 \geq 12$

$x_1 + x_2 \geq 4$

$x_1, x_2 \geq 0$



Feasible Region

This is the case of 'Unbounded Feasible Region'.

LINEAR PROGRAMMING PROBLEM

Linear : form meant a mathematical expression of the type

$a_1x_1 + a_2x_2 + \ldots\ldots\ldots + a_nx_n$

where $a_1, a_2, \ldots, a_n$ are constants,

and $x_1, x_2, \ldots\ldots, x_n$ are variables.

Programming : refers to the process of determining a particular program or plan of action.

Linear Programming Problem(LPP): Technique for optimizing(maximizing/minimizing) a linear function of variables called the 'OBJECTIVE FUNCTION' subject to a set of linear equations and/or inequalities called the 'CONSTRAINTS' or 'RESTRICTIONS'.

FORMULATION OF LP PROBLEMS

LP Model Formulation

- Objective function
  - a linear relationship reflecting the objective of an operation
  - most frequent objective is to *maximize profit* or to *minimize cost.*
- Decision variables
  - an unknown quantity representing a decision that needs to be made. It is the quantity the model needs to determine
- Constraint
  - a linear relationship representing a restriction on decision making