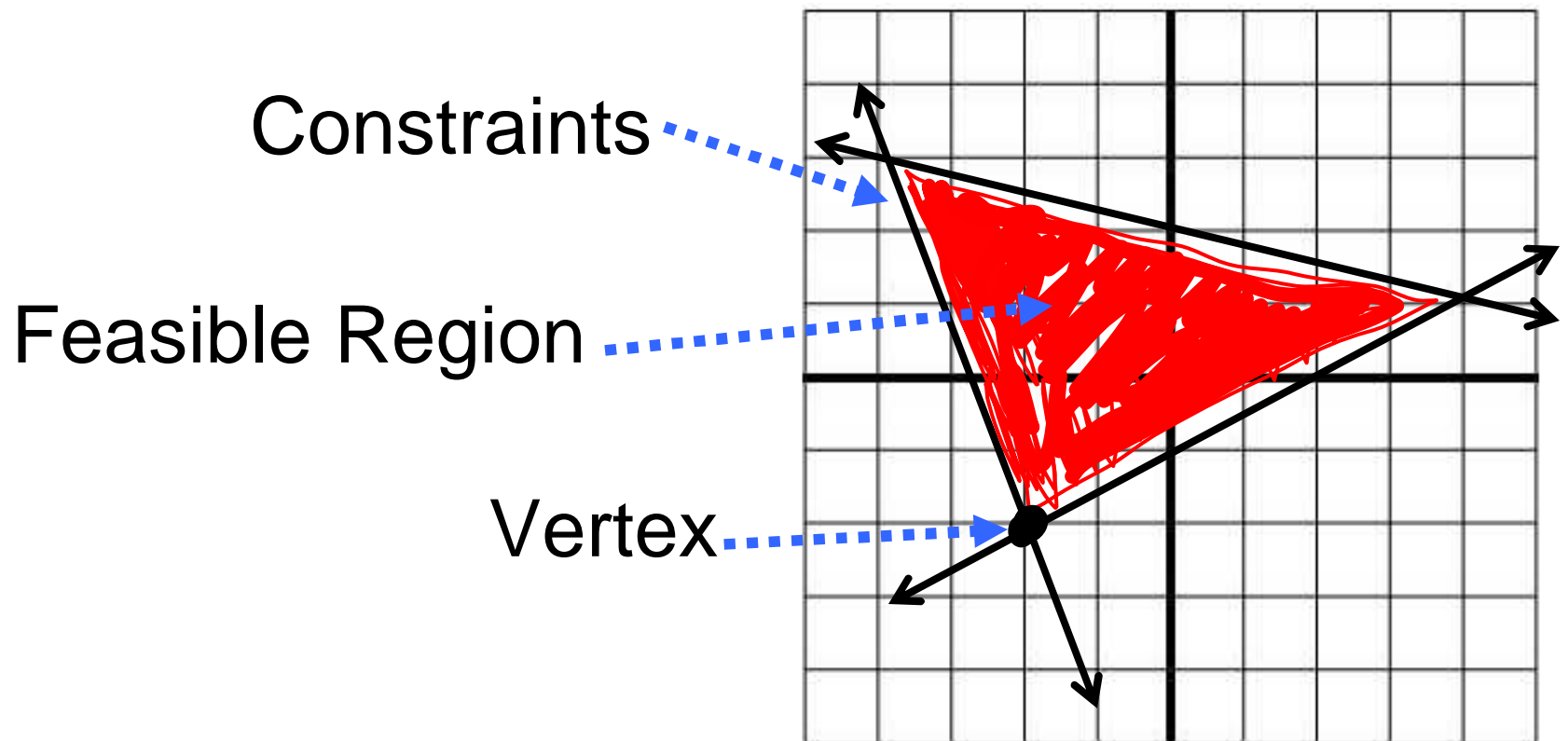


# 3.4 Linear Programming

- 1) Find the maximum and minimum values of a function over a region,
- 2) Solve real-world problems using linear programming.



# Maximum and Minimum Values

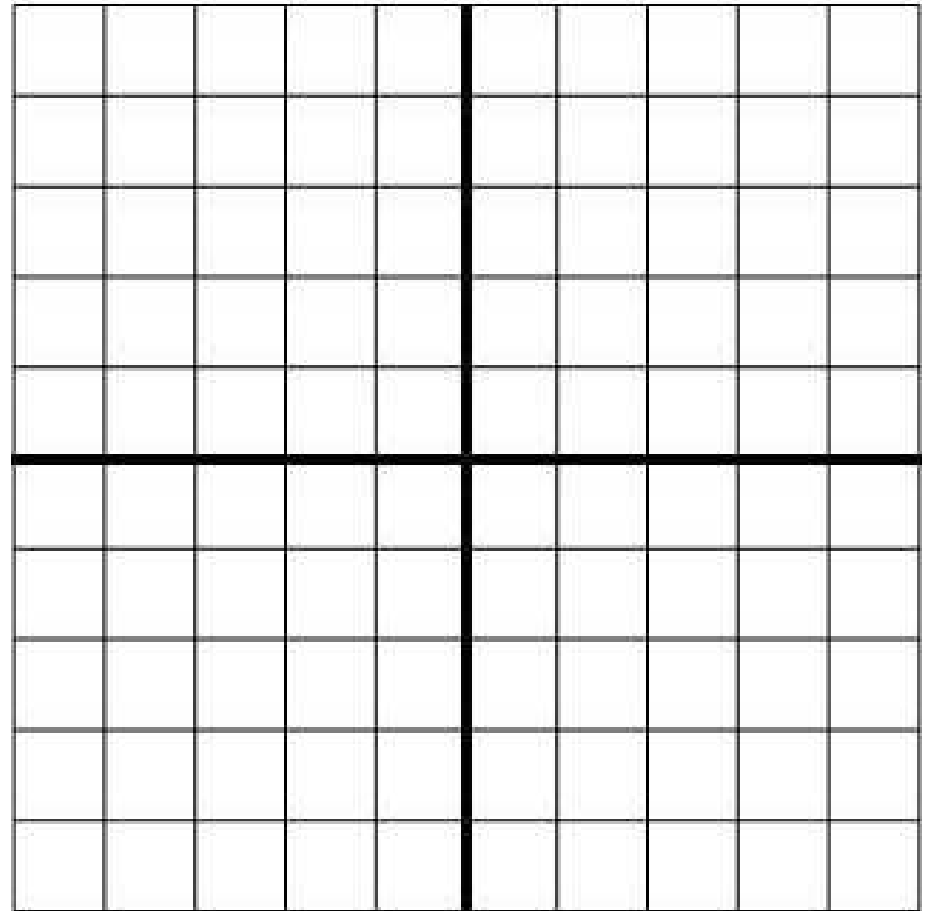
The maximum or minimum values will always occur at the vertices of the feasible region.

Graph the following inequalities  
and find the maximum and  
minimum values for the function  
 $f(x,y) = 3x + y$

$$x \geq 1,$$

$$y \geq 0$$

$$\text{and } 2x + y \leq 6$$



Use the table to find the maximum and minimum values.

$(x,y)$	$3x + y$	$f(x,y)$

Max. =

Min.=

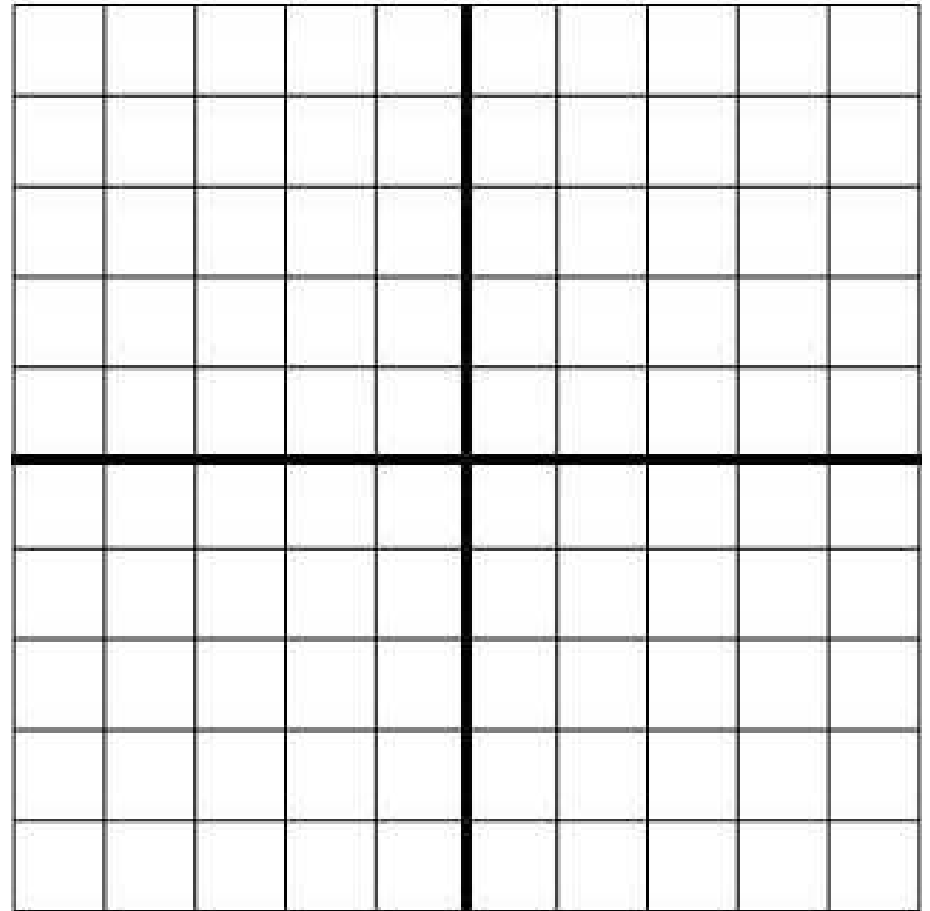
# Unbounded Region

Graph the following system of inequalities and find the maximum and minimum values for the function  $f(x,y) = 5x + 4y$ :

$$2x + y \geq 3$$

$$3y - x \leq 9$$

$$2x + y \leq 10$$



$(x,y)$	$5x + 4y$	$f(x,y)$

# Linear Programming

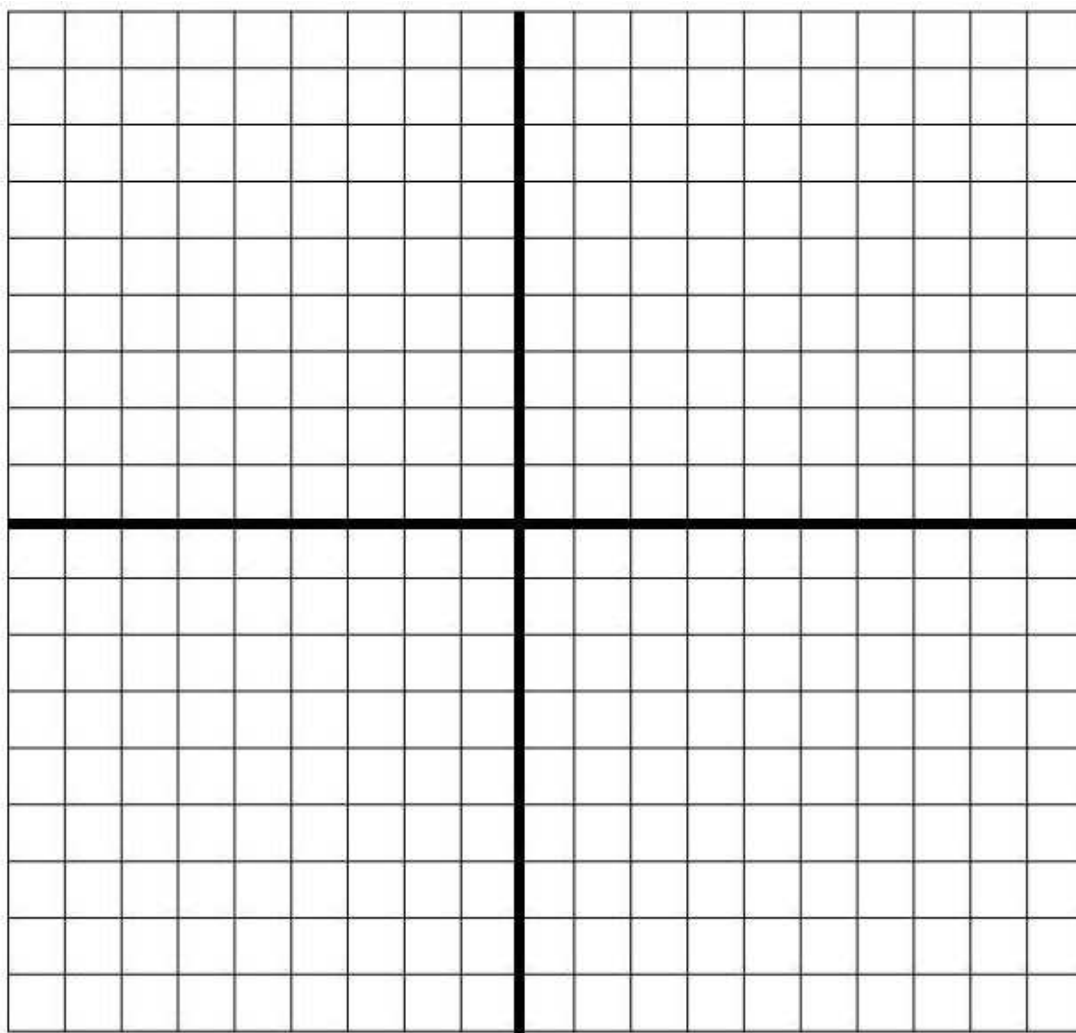
The process of finding maximum and minimum values of a function for a region defined by inequalities is called ***linear programming***. Here are the steps to follow for solving a linear programming problem:

P. 130

- 1) Define the variables
- 2) Write a system of inequalities
- 3) Graph the system of inequalities
- 4) Find the coordinates of the vertices of the feasible region
- 5) Write a function to be maximized or minimized
- 6) Substitute the coordinates of the vertices into the function
- 7) Select the greatest or least values.

# Real-World Example of Linear Programming

A parking lot has an area of 600 square meters of space. A car requires 6 meters and a bus requires 30 meters of space. The attendant can handle no more than 60 vehicles. If a car is charged \$3 to park and a bus is charged \$8, how many of each type of vehicle should the attendant let in to maximize income?





# HOMEWORK

Day #1 p. 132 #15-29

Day #2 p. 132 #9-14, handout