

MATH 210 FINITE MATHEMATICS

BRIAN VEITCH • FALL 2016 • NORTHERN ILLINOIS UNIVERSITY

3.1 Graphing Linear Equalities

Definition 1: Two Forms of a Linear Equation

$$ax + by = c$$

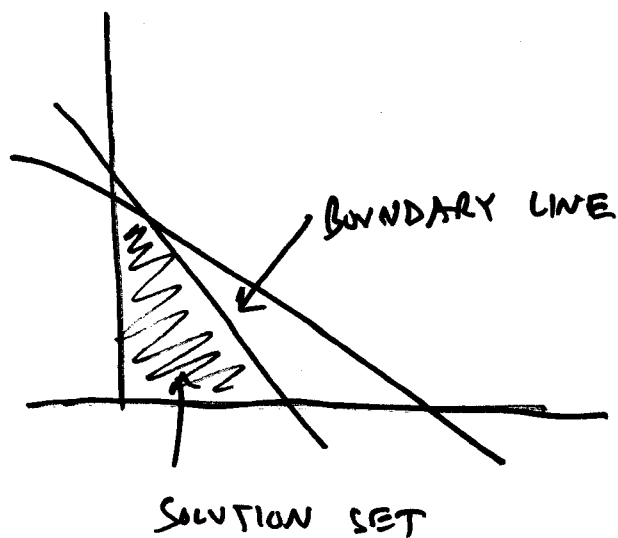
$$y = mx + b$$

Definition 2: Linear Inequalities

$$ax + by \leq c$$

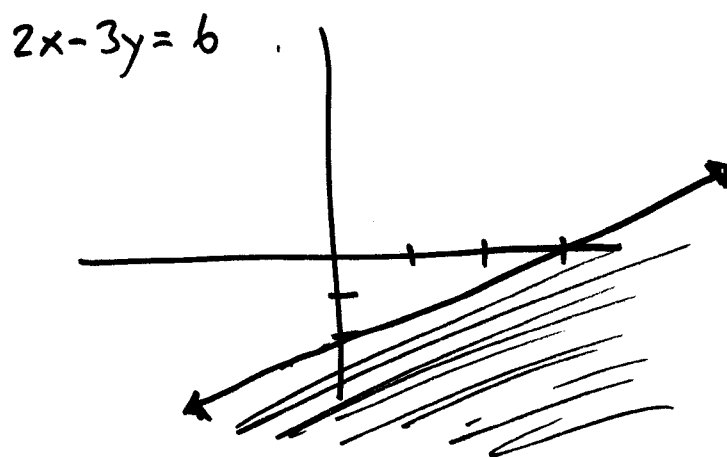
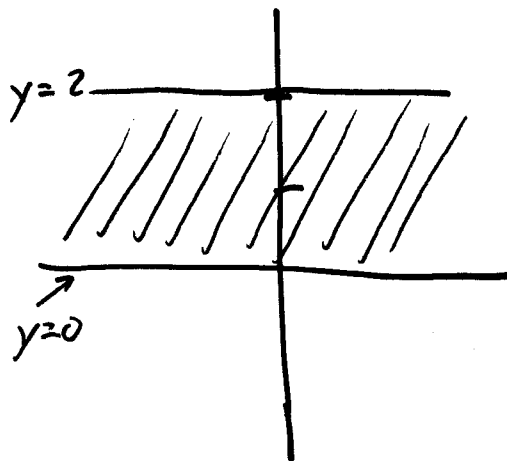
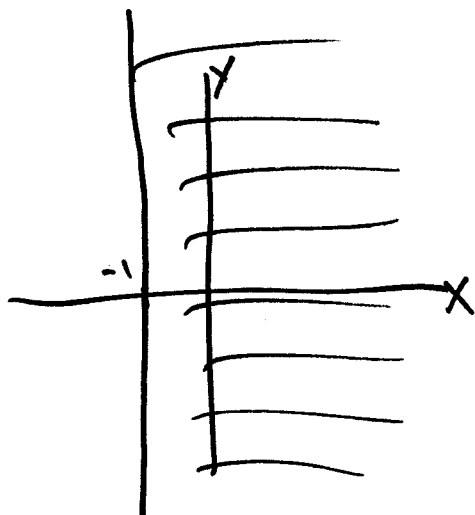
$$ax + by \geq c$$

Definition 3: Boundary and Solution Set



Steps 1

1. Draw the line by replacing the inequality with an equals
2. Pick a test point on one side of the line
3. If the inequality is satisfied, shade that side
4. If the inequality is not satisfied, shade the other side

Example 1Graph $2x - 3y \geq 6$ **Example 2**Graph $x \geq -1$ and $0 \leq y \leq 2$ 

Steps 2: Graphing a System of Linear Inequalities

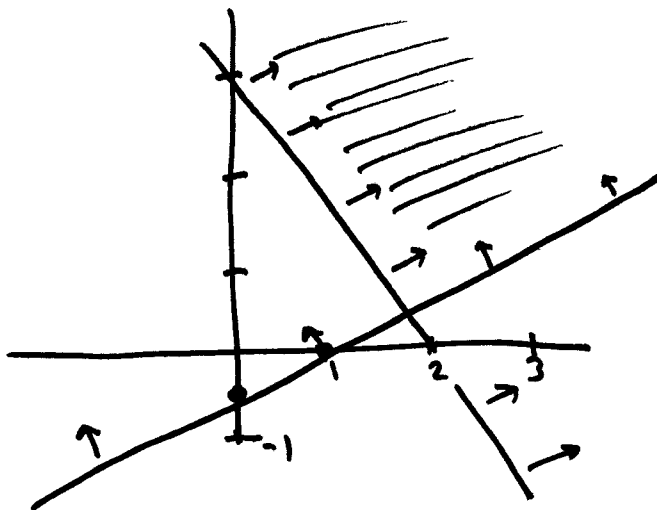
1. Graph the two linear inequalities
2. The solution set, S , is the region where the inequalities are both TRUE.

Example 3

Graph the solution set for

$$x - 2y \leq 1$$

$$3x + 2y \geq 6$$



Example 4

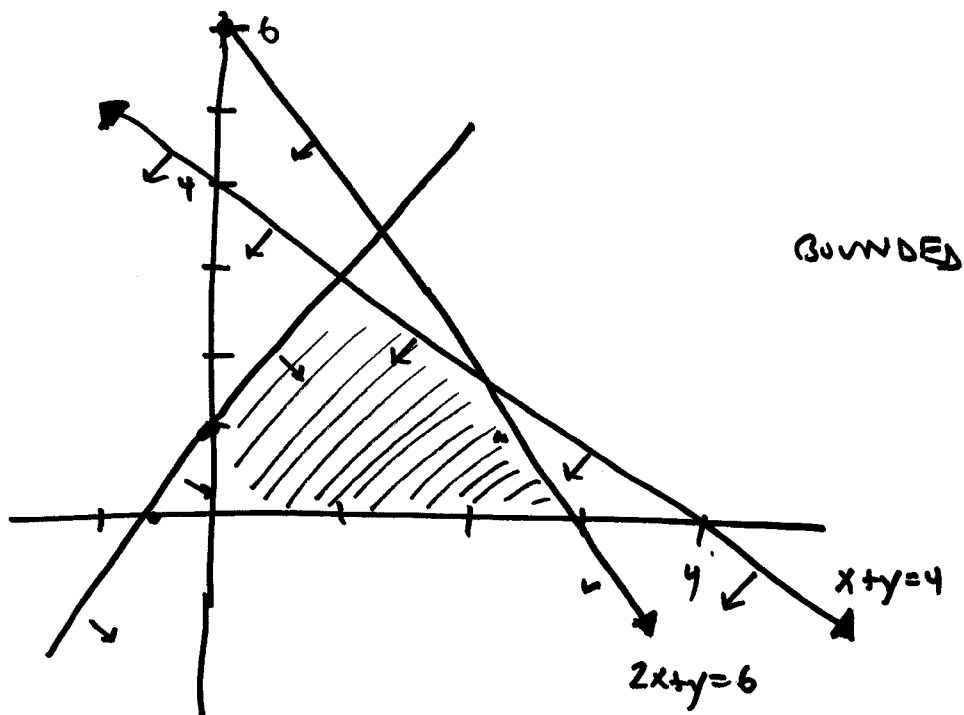
Graph the solution set for

$$x + y \leq 4$$

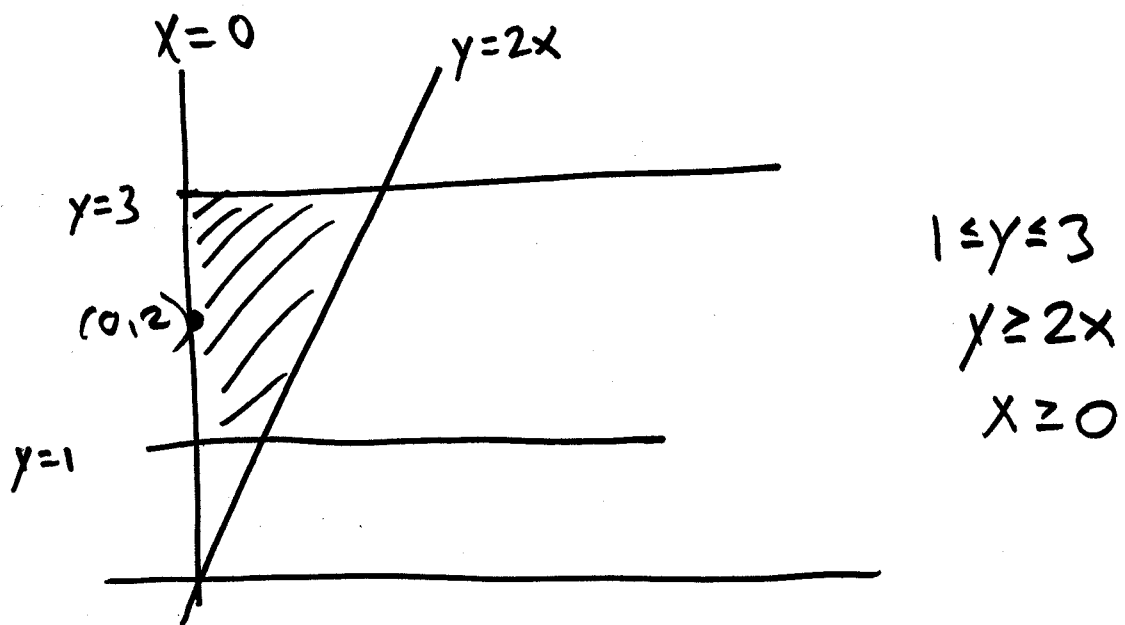
$$2x + y \leq 6$$

$$2x - y \geq -1$$

$$x \geq 0, y \geq 0 \quad \text{--- STAY IN 1ST QUADRANT}$$

**Definition 4**

1. Bounded: **BOUNDED IF IT CAN BE ENCLOSED BY A CIRCLE**
2. Unbounded: **IF IT CANNOT BE ENCLOSED**



DESCRIBE THE SHADED REGION

EITHER $y \geq 2x$ OR $y \leq 2x$
 $2 \geq 2(0)$ $2 \leq 2(0)$
 $2 \geq 0$ $2 \leq 0$