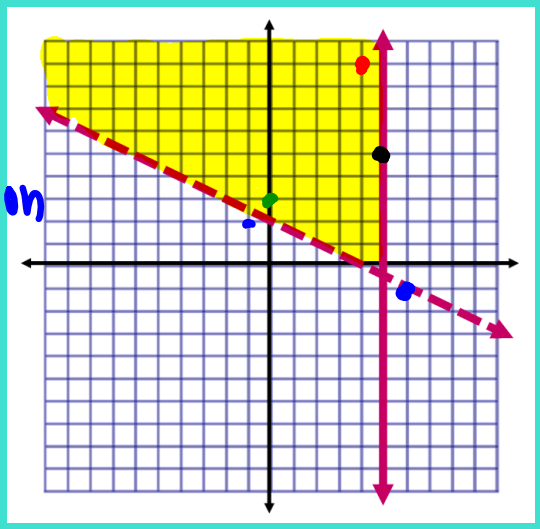
Systems of Linear Inequalities

- A collection of linear inequalities in the same variables
- The solution is any ordered pair that satisfies each of the inequalities of the system
- The graph of a system is the graph of all solutions of the system

Example 1

Tell whether the ordered pair is a solution.

a) (-1, 2) not a solution
b) (0, 3) Solution
c) (4, 9) Solution
d) (5, 5) Solution
e) (6, -1) not a Solution



Example 2

Graph the system.

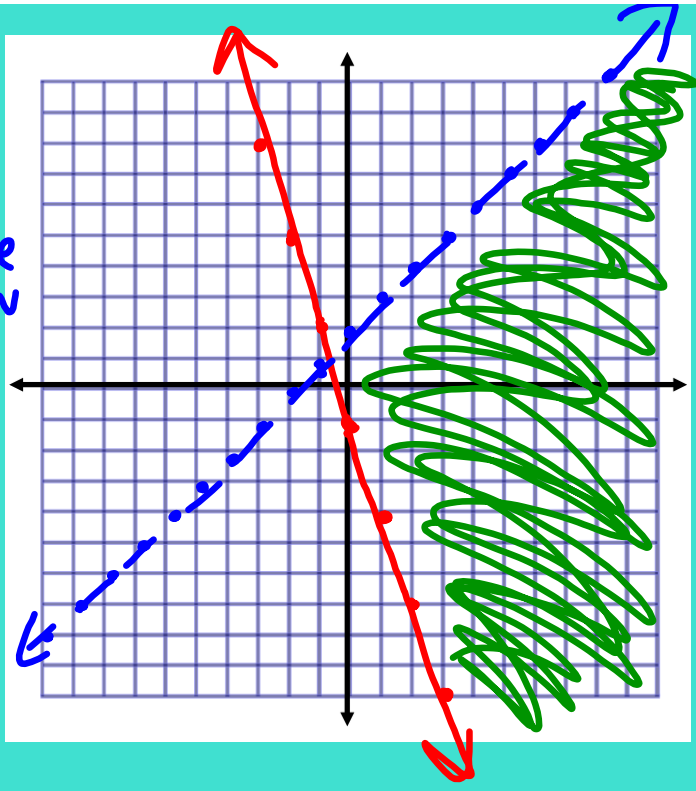
① $y \geq -3x - 1$ solid line/shade up
② $y < x + 2$ dotted line/ shade below

① $y \geq -3x - 1$

$m = \frac{-3}{1}$ ↓ ↓ $b = -1$

② $y < x + 2$

$m = \frac{1}{1}$ $b = 2$

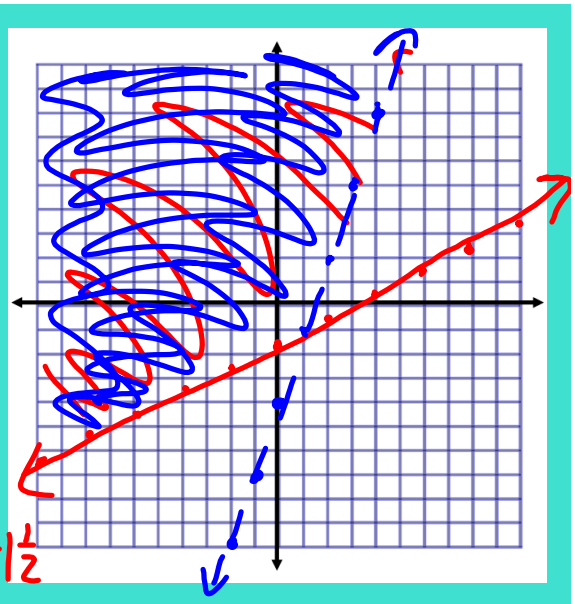


Example 3

Graph the system.

① $x - 2y \leq 3$

② $y > 3x - 4$



① $x - 2y \leq 3$

$-x \quad -x$

$\frac{-2y}{-2} \leq \frac{3}{-2} - \frac{x}{-2}$

$y \geq \frac{-3}{2} + \frac{1}{2}x$

$m = \frac{1}{2}$ $b = \frac{-3}{2}$ or $-1\frac{1}{2}$

Solid line/shade above

② $y > 3x - 4$

$m = \frac{3}{1}$ $b = -4$

dotted line/shade above

Example 4

Graph the system.

① $x \geq 0$ → solid line shade above

② $y \geq 0$ → solid line shade above

③ $4x + 3y \leq 24$

$-4x \quad -4x$

$\frac{3y}{3} \leq \frac{24}{3} - \frac{4x}{3}$

$y \leq 8 - \frac{4}{3}x$

$m = \frac{-4}{3}$ $b = 8$

solid line/shade below

Example 5

Graph the system.

① $x \leq 0$ solid line, shade below

② $y > 0$ dotted line

③ $x - y \geq -2$

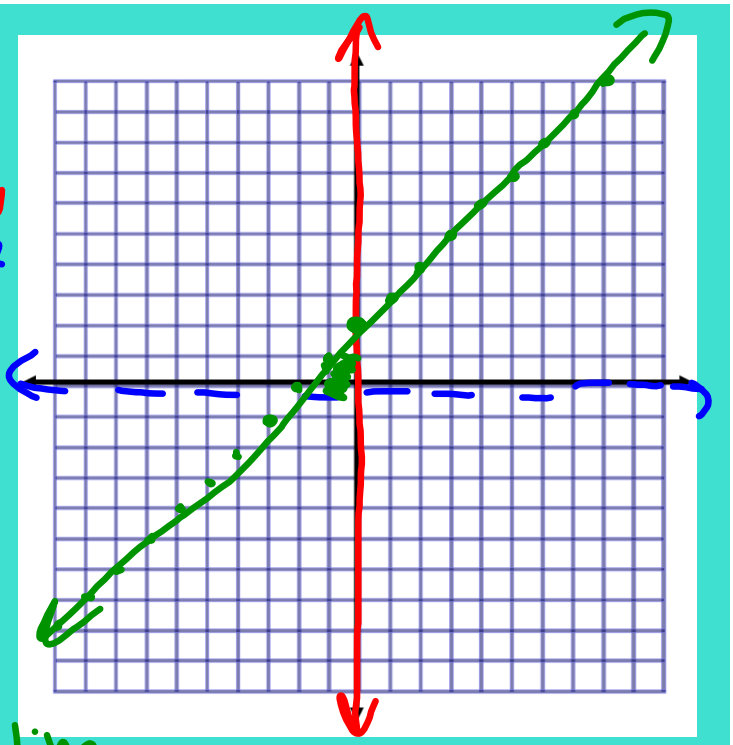
$-x \quad -x$

$\frac{-y}{-1} \geq \frac{-2}{-1} - \frac{x}{-1}$

$y \leq 2 + x$

$m = \frac{1}{1} \quad b = 2$

solid line, shade below

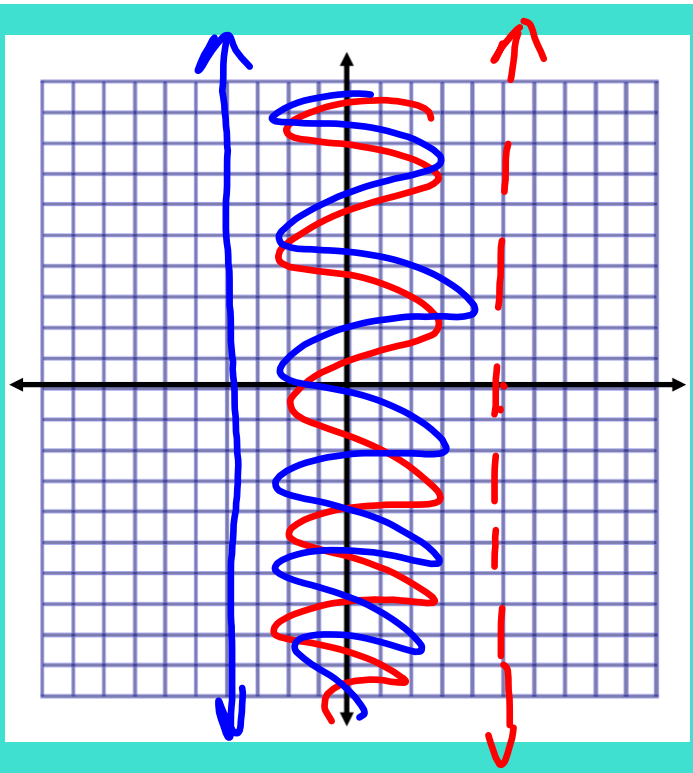


Example 6

Graph the system.

① $x < 5$ dotted line, shade below

② $x \geq -4$ solid line, shade above



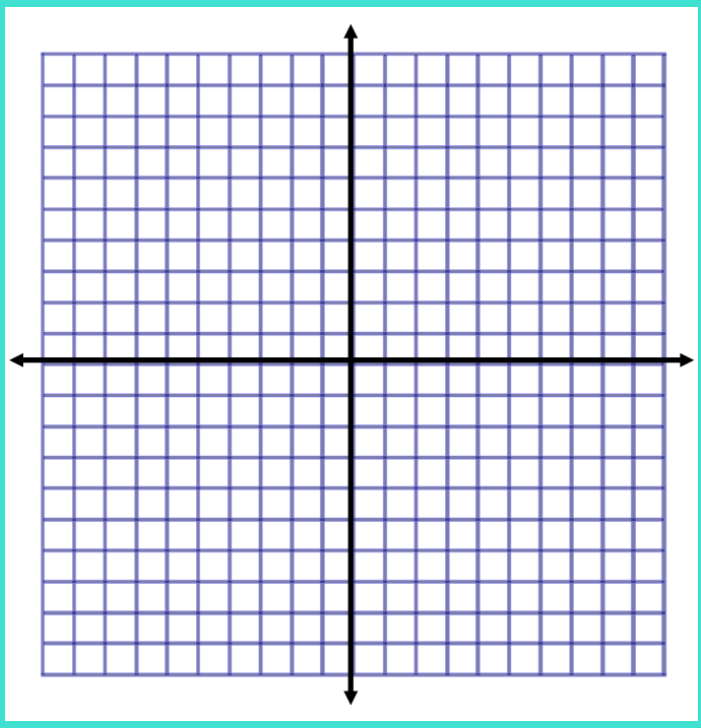
Example 7

Graph the system.

$y > -4$

$x \geq -1$

$y < 3$



Example 8

Graph the system.

$2x - 3y > -6$

$5x - 3y < 3$

$x + 3y > -3$