## Unit 5 Day 10: Solving Systems of Inequalities

To solve a system of inequalities:

- Graph the first boundary line and shade the appropriate half plane with vertical lines or a colored pencil
- Graph the 2nd boundary line and shade the appropriate half plane with horizontal lines or a different colored pencil
- Darken the area where the two shaded regions overlap.

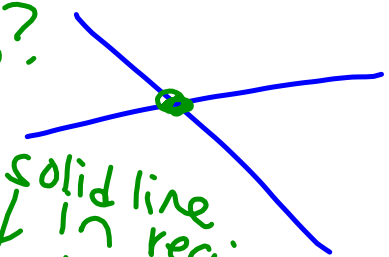**The darkened area represents all of the solutions of the system.**

Example 1: $y < -2x - 1$
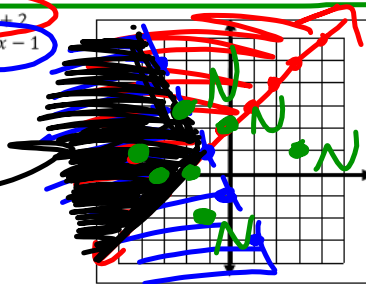
Solution region

Where do they overlap?

System of equations

on solid line in region

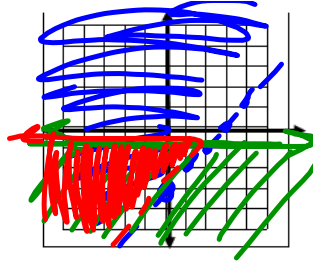a.) Give 3 solutions to example 4.

Points $(-4, 1)$, $(-3, 0)$ $(-2, 0)$

b.) Give 3 points that are not solutions to example 4.

$(3, 1)$ $(-1, -2)$ $(0, 2)$ $(-2, 3)$
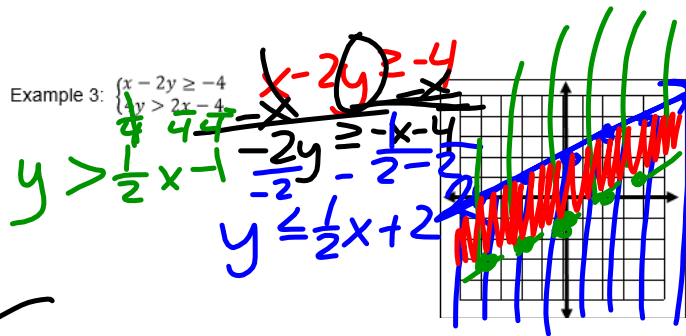
dotted line

c.) Is a point on either boundary line a solution? Why or why not?

a point on a solid line in overlapping area IS a solution, but a point on a dotted line is never a solution!
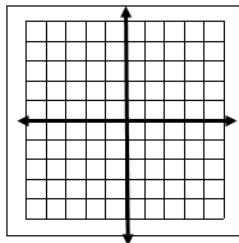
Example 2: $\begin{cases} y > -x = 3 \\ y \le -1 \end{cases}$

Example 3: $\begin{cases} x - 2y \ge -4 \\ y > 2x - 4 \end{cases}$

$x - 2y \ge -4$

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

$-2y \ge -x - 4$

$\frac{-2y}{-2} \ge \frac{-x}{-2} - \frac{4}{-2}$

$y \le \frac{1}{2}x + 2$

Example 4: $\begin{cases} x \ge 1 \\ 2y + x < 4 \end{cases}$

d.) Give 3 solutions to example 4.

e.) Give 3 points that are not solutions to example 4.

f.) Is a point on either boundary line a solution? Why or why not?

Practice/Closure Day 2 Solving Systems of Inequalities Continued

Treasure Hunt

An archeologist has discovered a series of coordinates that may represent the location of buried treasure. After deciphering the coded messages, it seems that the only true coordinates of the treasures are those coordinates that lie within the solution of the systems of inequalities.
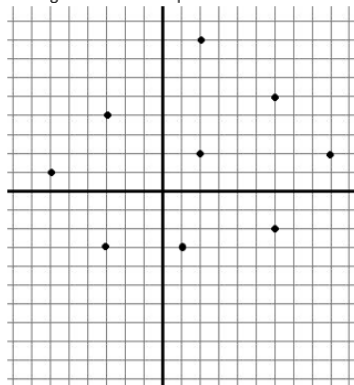
Potential Treasures may be located at the coordinates designated on the map below.

$2x + 3y \leq 18$

$-4x - 4y < 8$

$-3x + 4y \leq 12$

$4x - 5y < 20$

Location of the treasure: _____