

Your Name

Mrs. T

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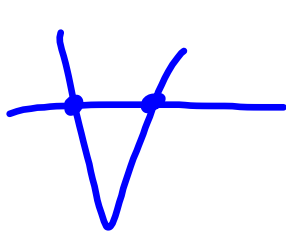
Notes

6-8

Graphing Systems of Inequalities In Two Variables

Objective: To be able to graph two inequalities in two variables on a coordinate plane and determine the solutions by shading. To be able to test a point in both equations to determine which region is a solution.

Virtue/Skill: These help to determine feasible solutions for companies' profit and cost margins.



$$y = -\frac{5}{2}x - 7$$

$$y = -\frac{5}{2}x - 1$$

$$3.5 = \frac{7}{2}$$

$x > 8$

$y > -2x + 2$ and $y \leq x + 1$

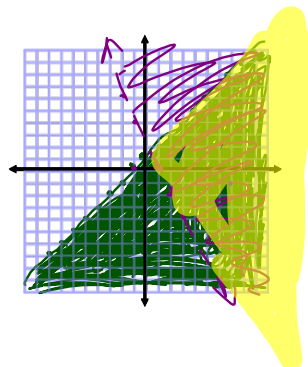
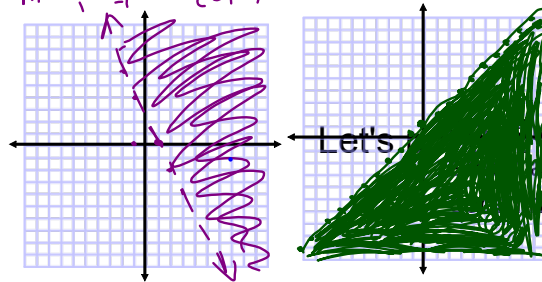
$m = \frac{-2}{1} = -2$ (0,2)

Let's graph them together

- 1) Graph y intercept (0,b) $y = mx + b$
- 2) Use slope to make more points
- 3) Connect points together. $y > \text{or } y \leq$ are all shaded lines $y > \text{or } y <$ are all shaded below
- 4) Shade region of solutions

$y > \text{or } y \geq$ shade above

$y < \text{or } y \leq$ shade below



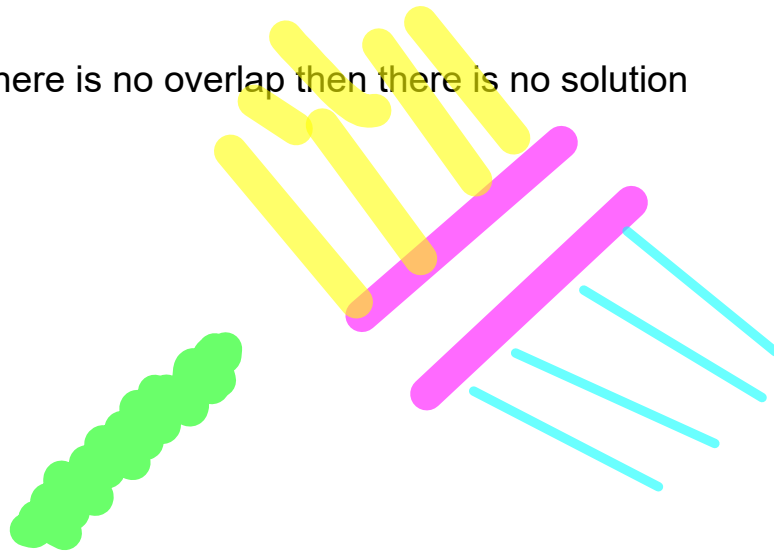
Let's put that together!

Graphing
Systems of
Inequalities

Step 1: Graph each inequality and shade lightly

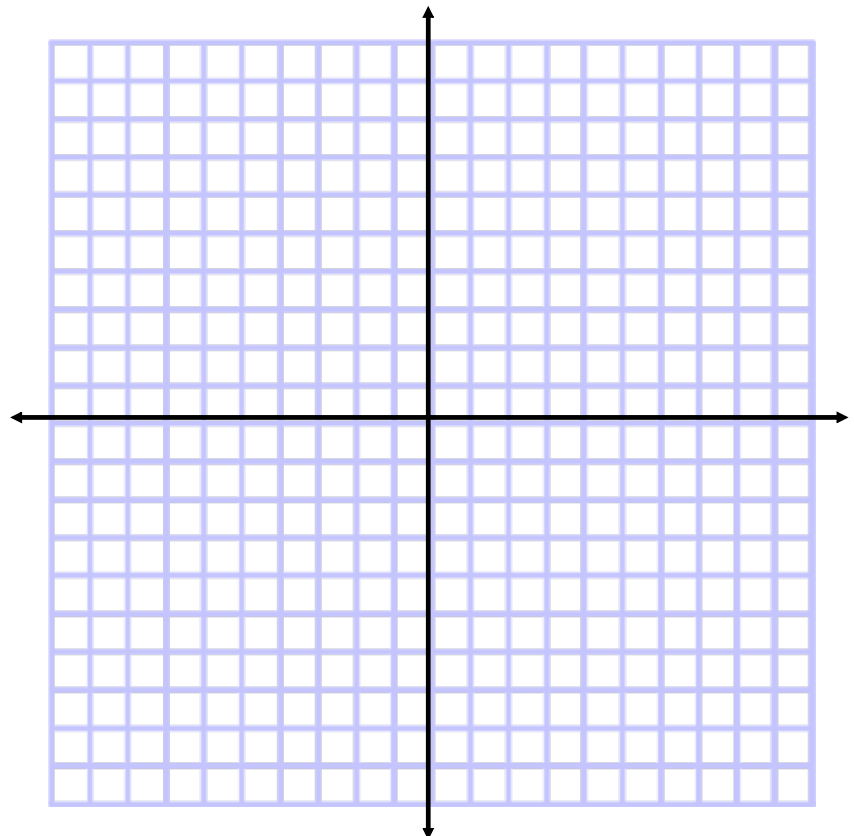
Step 2: Darken the shading of the overlapping region (these are the solutions that work for both inequalities)

*if there is no overlap then there is no solution



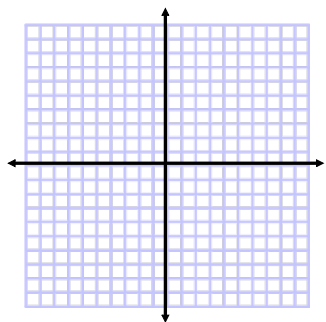
$$y > -3x + 2$$

$$y < -2 - 3x$$



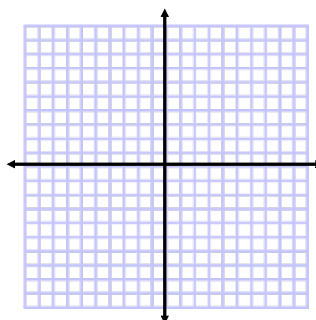
$$y > -5$$

$$y < 0$$



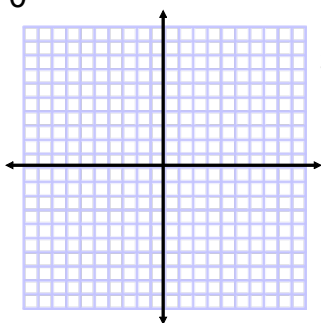
$$y > -3x + 2$$

$$y < -2 - 3x$$



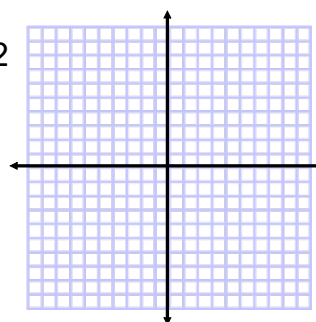
$$y > -1$$

$$x < 0$$



$$y \leq x + 1$$

$$3x + 4y \geq 12$$



Solving Systems of Equations and Inequalities by Graphing

look for intersecting points

1. Graph each line using the y-intercept and slope

2. Make dashed or keep solid

-if $y >$ or $y <$, make line dashed

-if $y \geq$ or $y \leq$, make line solid



3. Shade

-if $y >$ or $y \geq$ shade above line

-if $y <$ or $y \leq$ shade below line

4. Any points in shaded area or on solid line are solutions

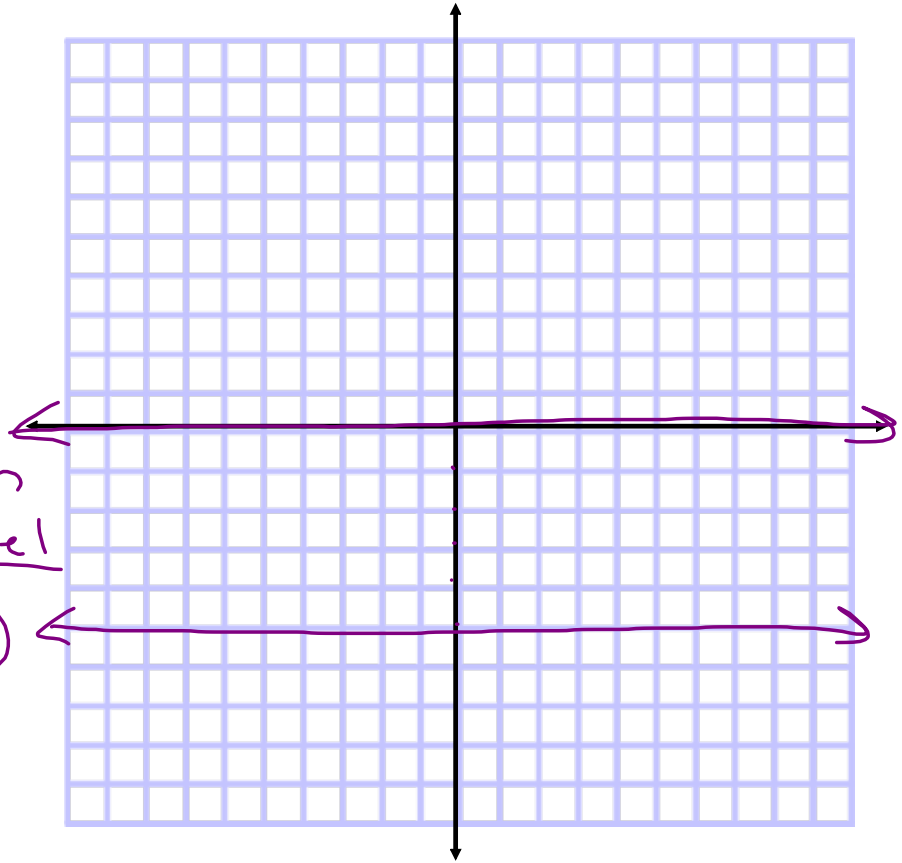
-To test, plug in and see if the statement remains true.

If it becomes false, the point and that half-plane is not a solution

$$\underline{y = -5}$$

$$y = 0$$

No Solution
 lines parallel
 (never cross)



Solve by graphing

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

$$m = -\frac{1}{2} = -\frac{1}{2} \quad (0, 3)$$

rise
run

$$3x + 6y = 18$$

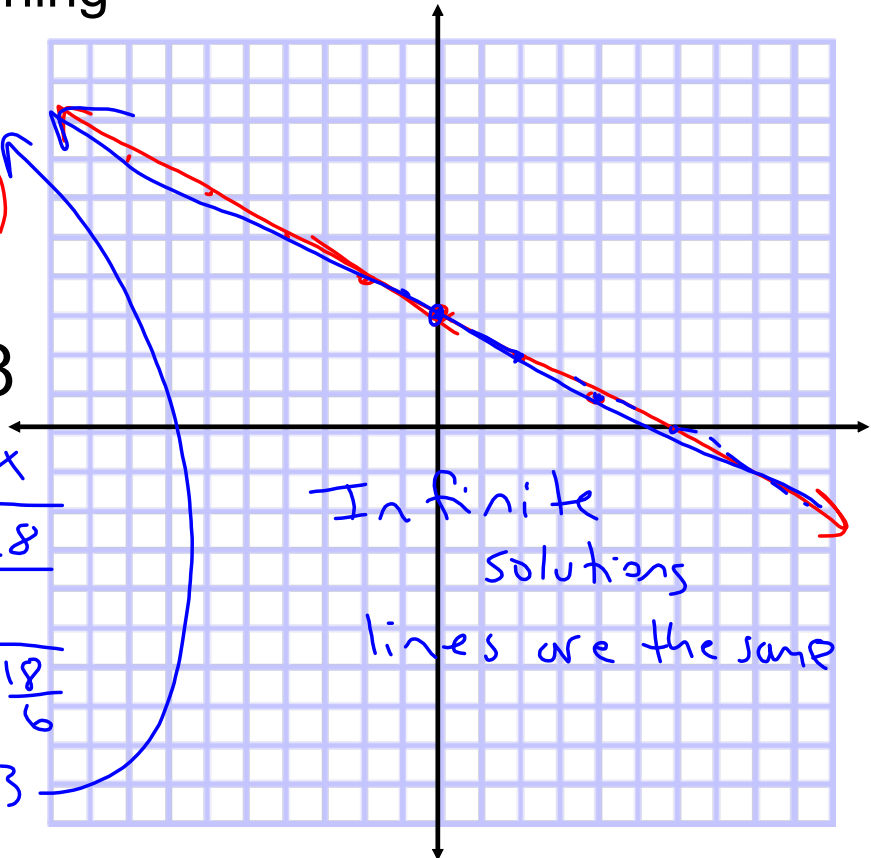
$$\begin{array}{r} -3x \qquad -3x \\ \hline \end{array}$$

$$\frac{\cancel{y} = -3x + 18}{\cancel{6} \qquad 6}$$

$$y = -\frac{3}{6}x + \frac{18}{6}$$

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

Infinite
 solutions
 lines are the same



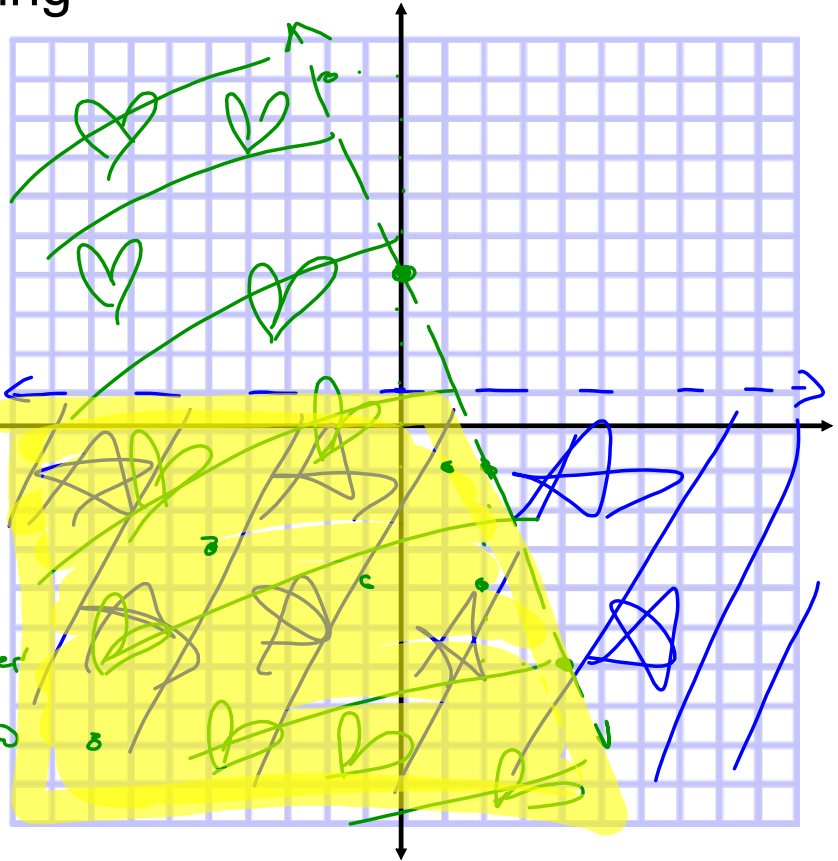
Solve by graphing

$$y < 1$$

↳ not =, dashed line
↳ less, below

$$y < -\frac{5}{2}x + 4$$

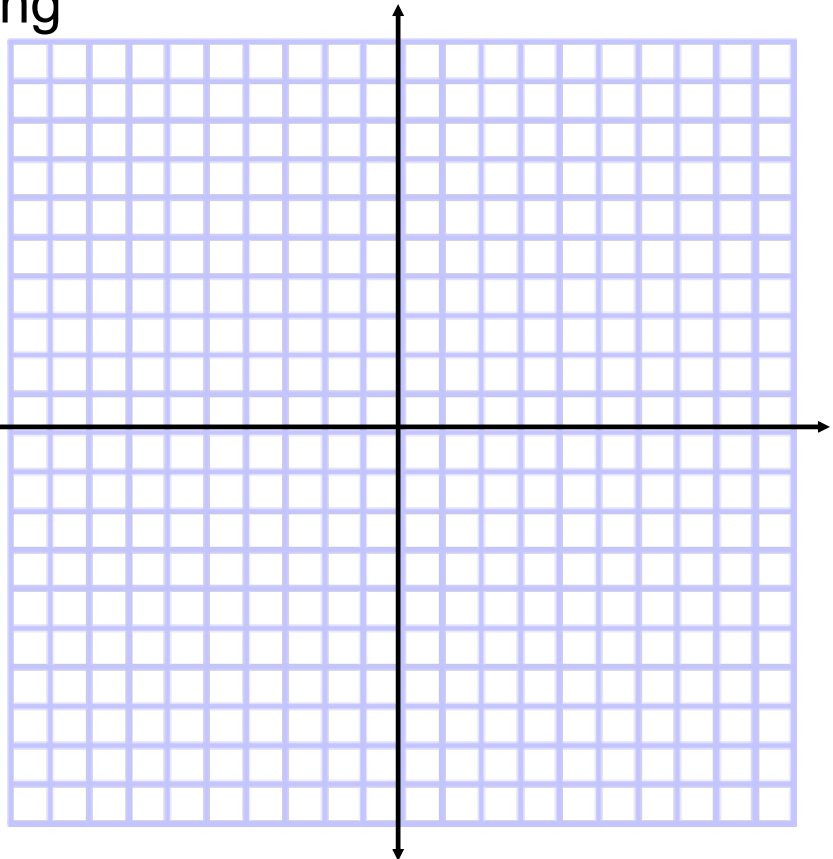
$m = -\frac{5}{2}$ (0, 4)
↳ not =, dashed
↳ less, below



Solve by graphing

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

$$y \leq \frac{1}{4}x - 3$$



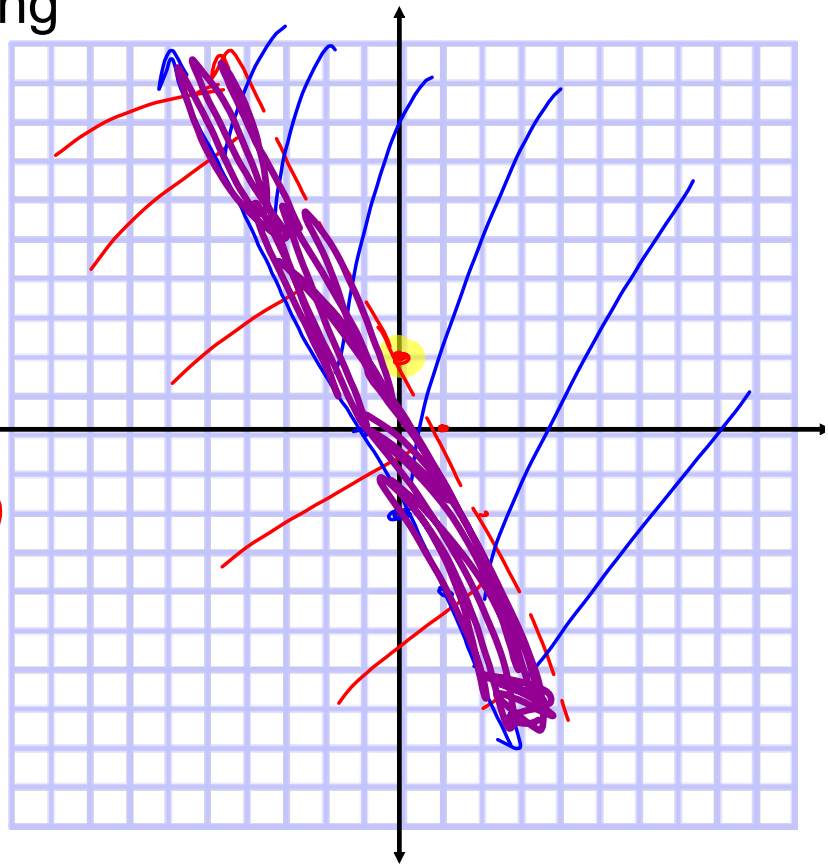
Solve by graphing

$$y < -2x + 2$$

$$m = -\frac{2}{1} \quad (0, 2)$$

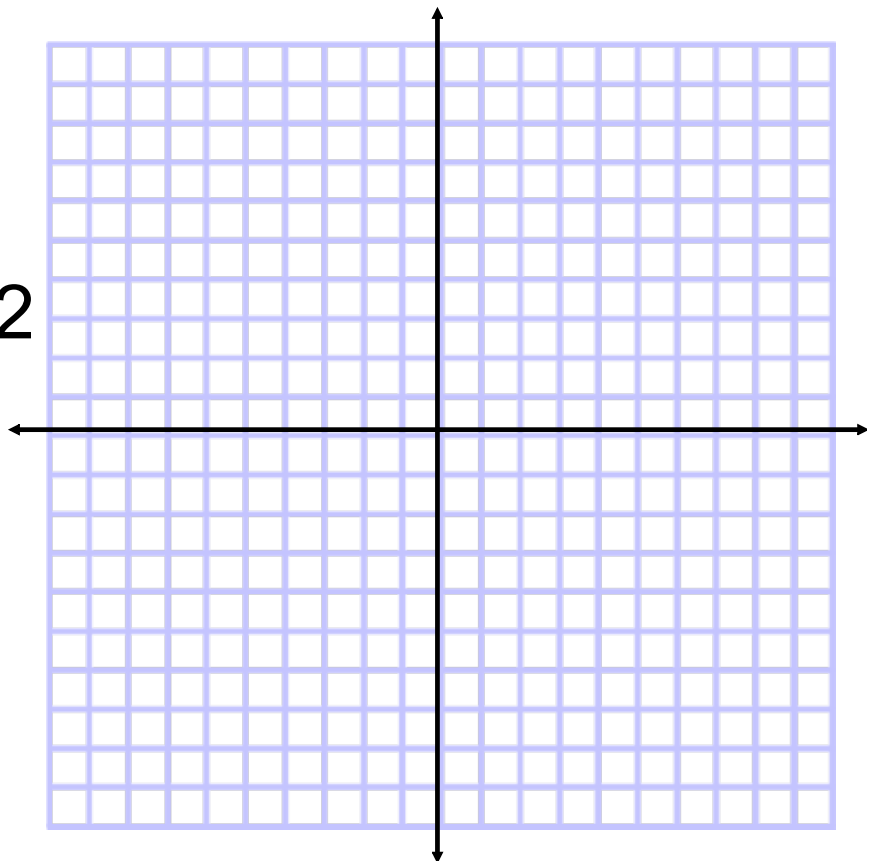
$$y \geq -2x - 2$$

$$m = -\frac{2}{1} \quad (0, -2)$$



$$y \leq x + 1$$

$$3x + 4y \geq 12$$

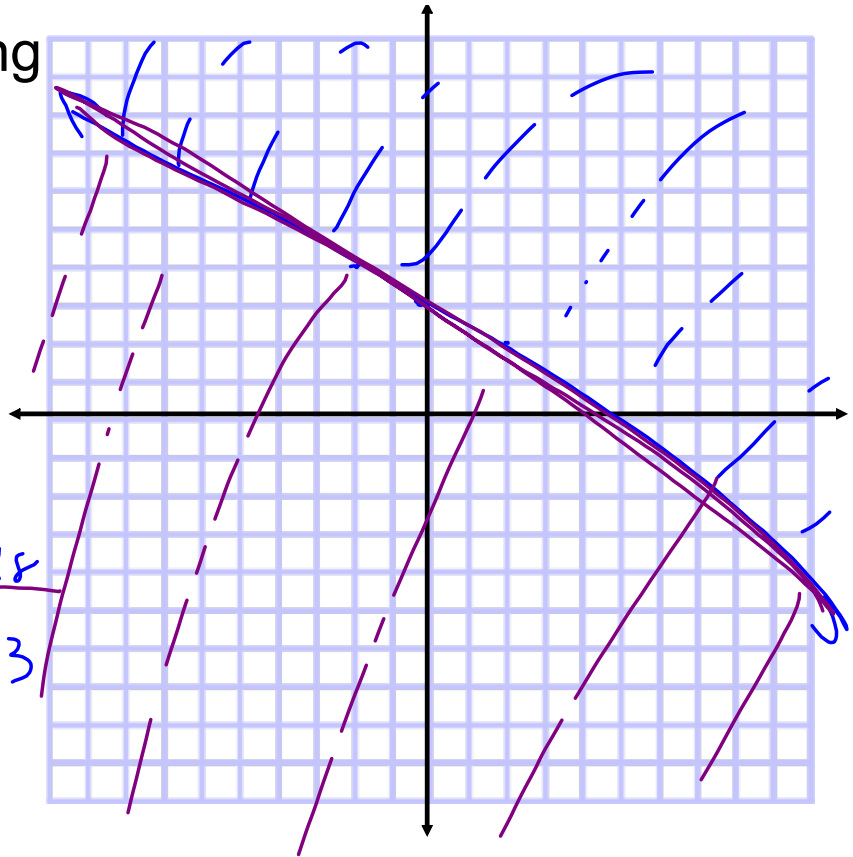


Solve by graphing

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

$$3x + 6y \leq 18$$

$$\begin{array}{r} -3x \\ 6y \leq -3x + 18 \\ \hline 6 \\ y \leq -\frac{1}{2}x + 3 \end{array}$$



$$\begin{array}{l} 3 > 2 \quad \checkmark \\ 2 > 2 \quad \times \\ y > 4|x+3|-2 \quad \text{V slope} \end{array}$$

$$y > 5$$

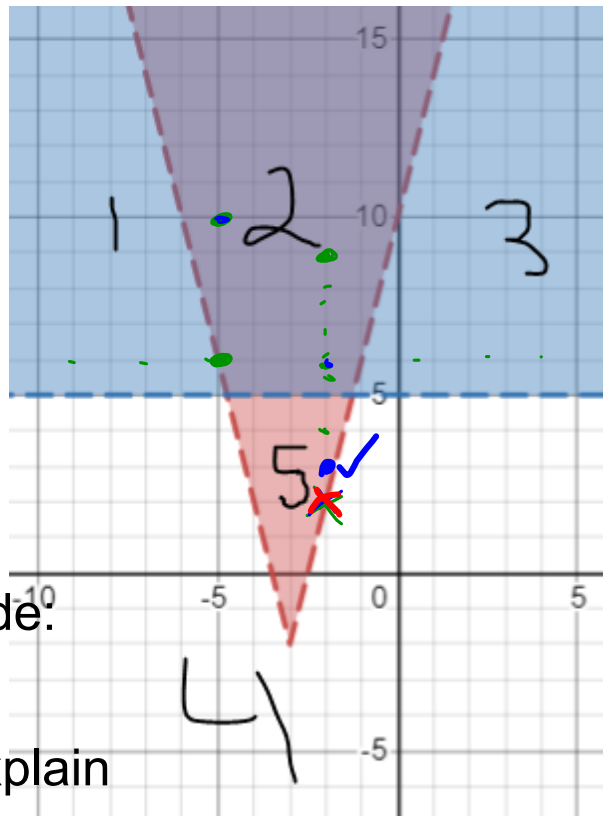
Solution Region: 2

2 Solution Points include:

$$\underline{(5, 10)} \quad \underline{(-2, 9)}$$

Is (-5, 6) a solution? explain

Not a solution
b/c it's on a dashed line



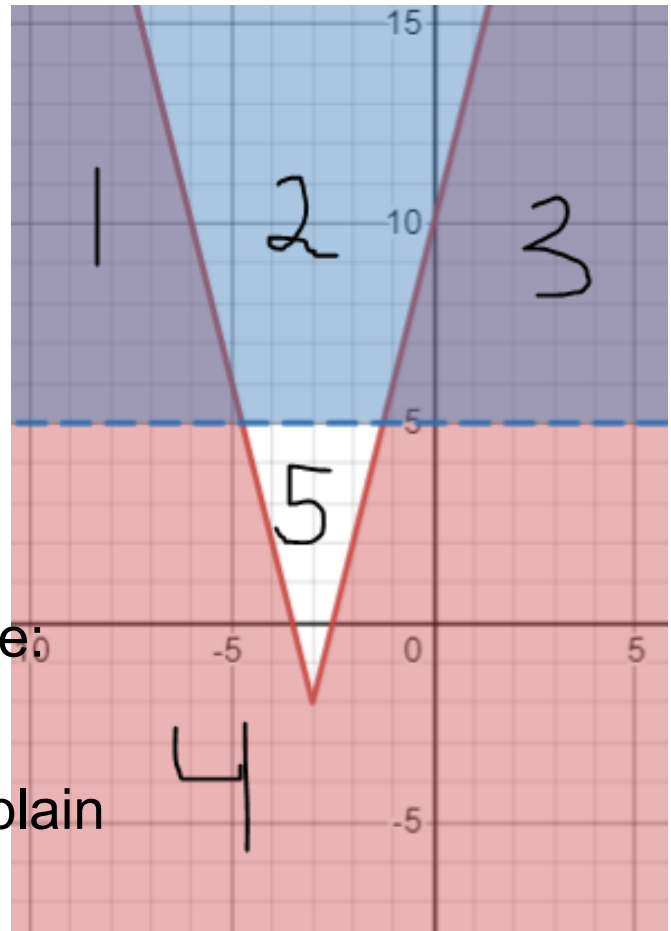
$$y \leq 4|x+3|-2$$

$$y > 5$$

Solution Region: 1 and 3

2 Solution Points include:

Is (-5, 6) a solution? explain



$$y \leq \frac{1}{2}x^2$$

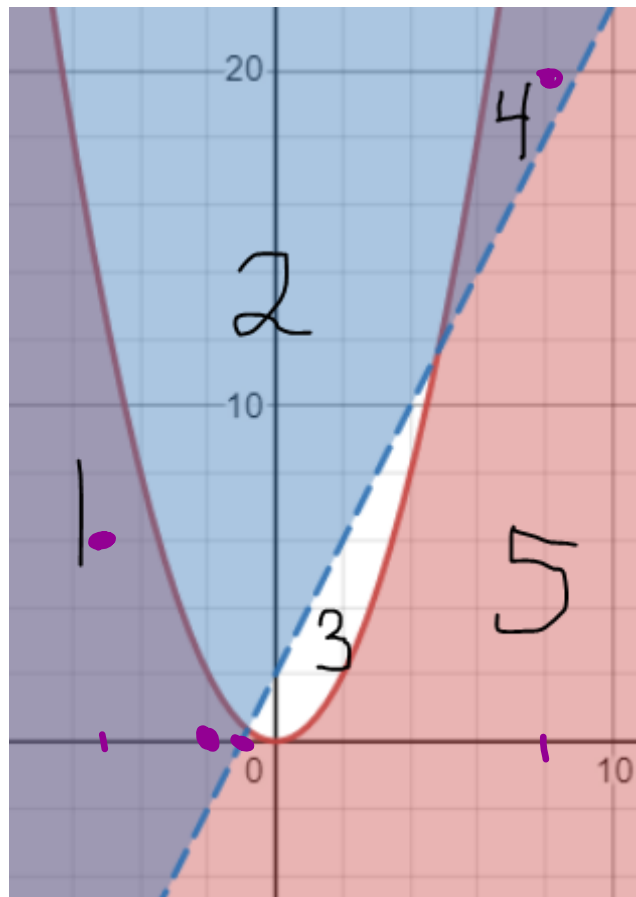
$$y > 2x+2$$

Solution Region: _____

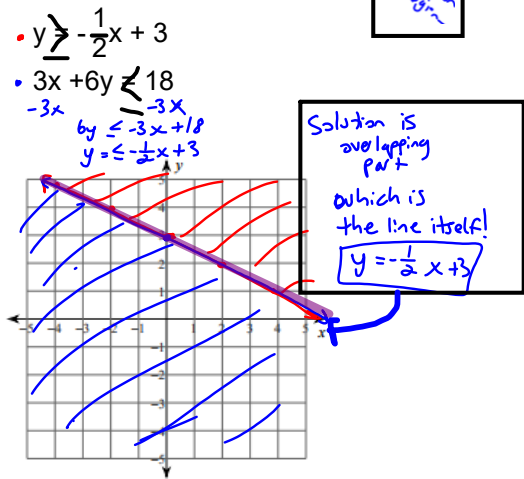
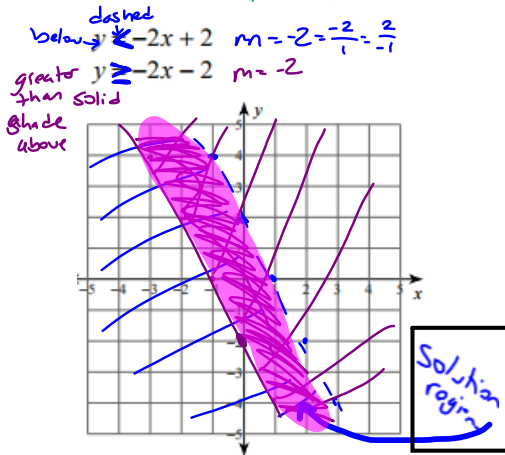
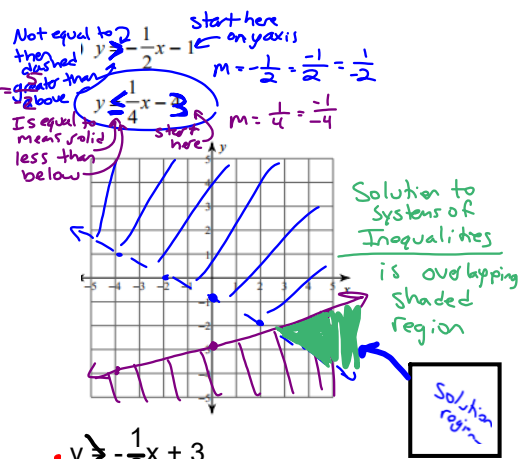
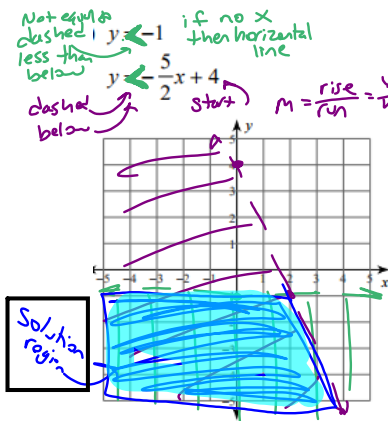
2 Solution Points include:

(_____)

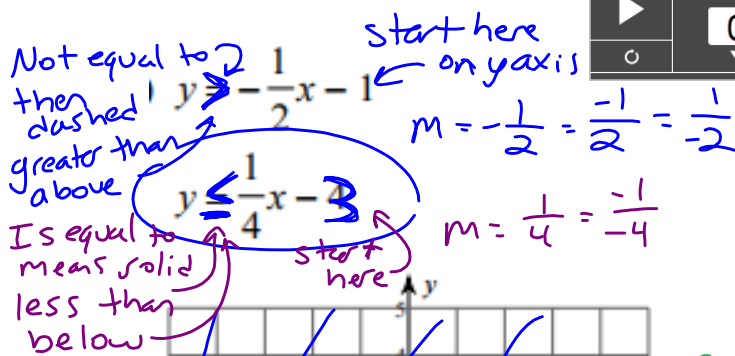
Is (-5, 6) a solution? explain



Shaded region



Solve by graphing



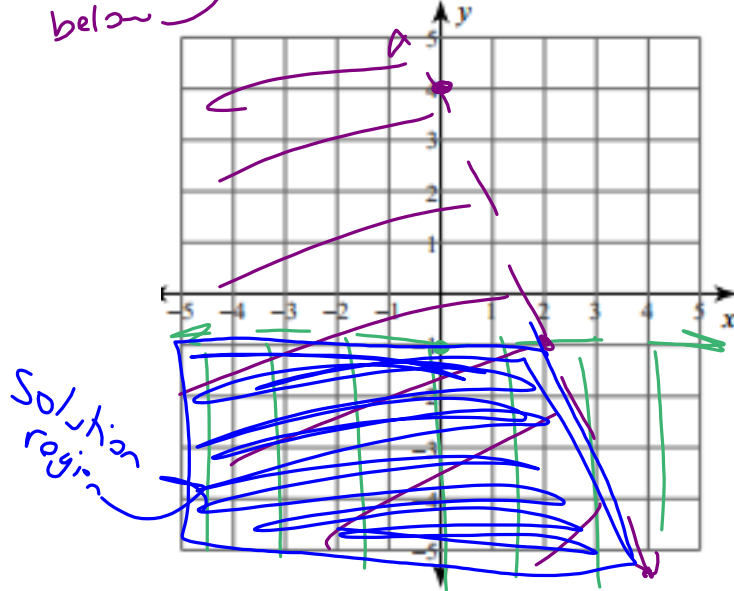
Solution to Systems of Inequalities is overlapping shaded region

Solve by graphing

Not equal to
dashed $y < -1$ if no x
less than then horizontal
below line

dashed $y < -\frac{5}{2}x + 4$
below start

$$m = \frac{\text{rise}}{\text{run}} = \frac{\text{vert.}}{\text{horiz.}} = \frac{-5}{2} = -\frac{5}{2}$$

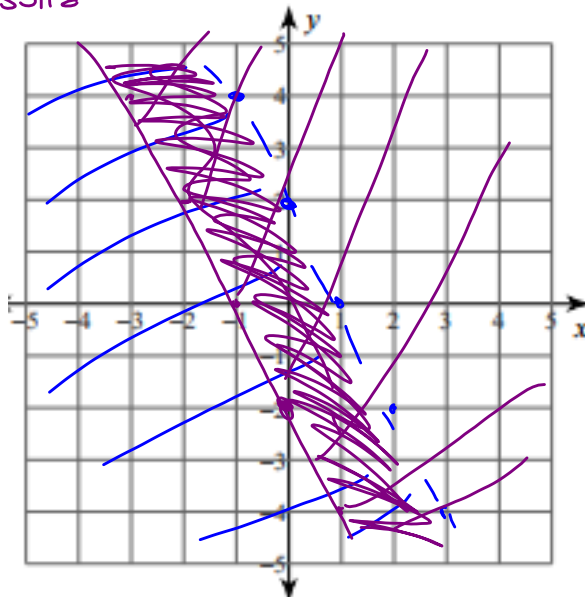
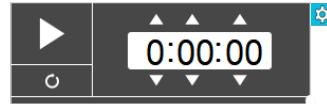


Solve by graphing

dashed below $y < -2x + 2$ $m = -2 = \frac{-2}{1} = -2$

greater than solid $y \geq -2x - 2$ $m = -2$

shade above

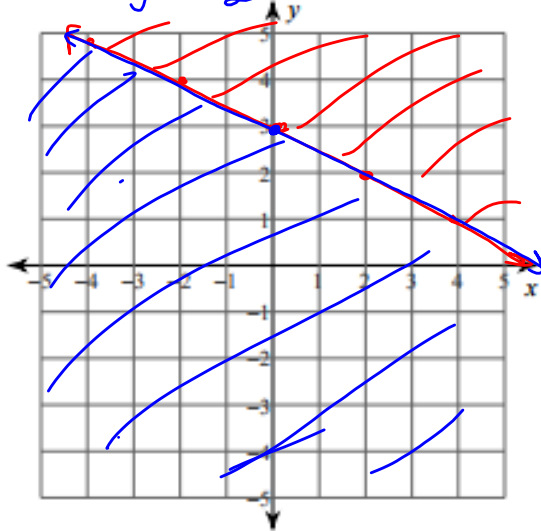


Solve by graphing



$y \geq -\frac{1}{2}x + 3$
 $3x + 6y \leq 18$
 $-3x \quad -3x$
 $by \leq -3x + 18$
 $y \leq -\frac{1}{2}x + 3$

Solution is overlapping part
 which is the line itself!
 $y = -\frac{1}{2}x + 3$



absolute value V shape
 $y > 4|x+3| - 2$

$y > 5$ horizontal line

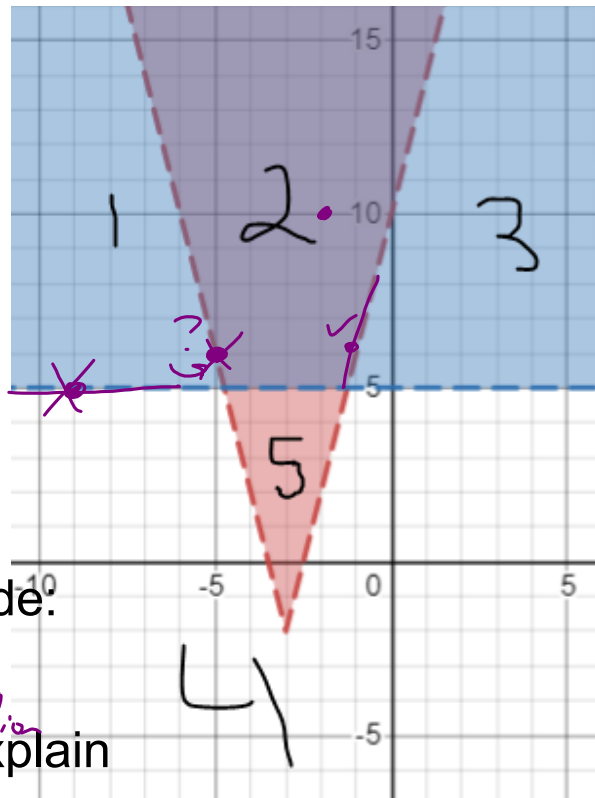
Solution Region: 2

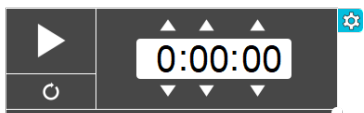
2 Solution Points include:

$(-2, 10)$ $(0, 15)$ Points in overlapping shaded region

Is $(-5, 6)$ a solution? explain

No on region boundary but boundary line is dashed





$$y \leq 4|x+3|-2$$

$$y > 5$$

Solution Region: 1 and 3

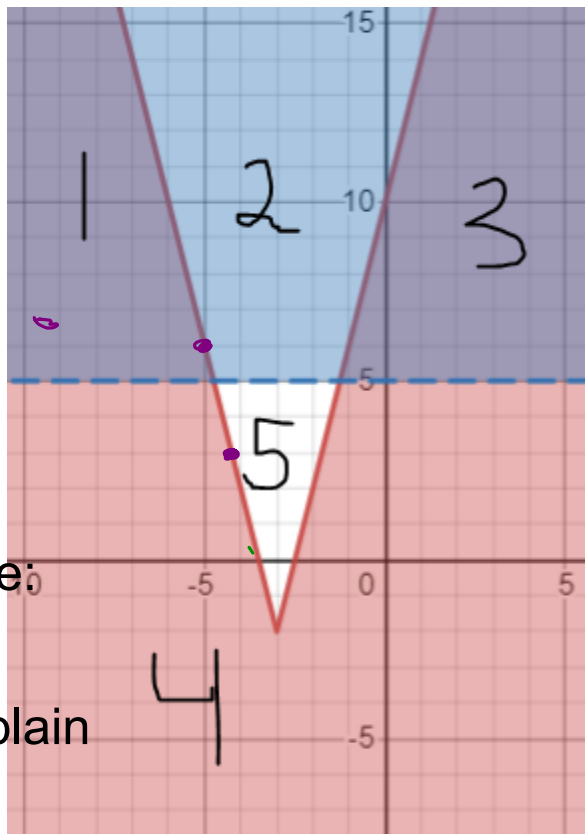
2 Solution Points include:

 (x,y)

Is (-5, 6) a solution? explain

Yes

next to solution region & lin is solid



$$y > 1/2 x^2$$

$$y > 2x+2$$

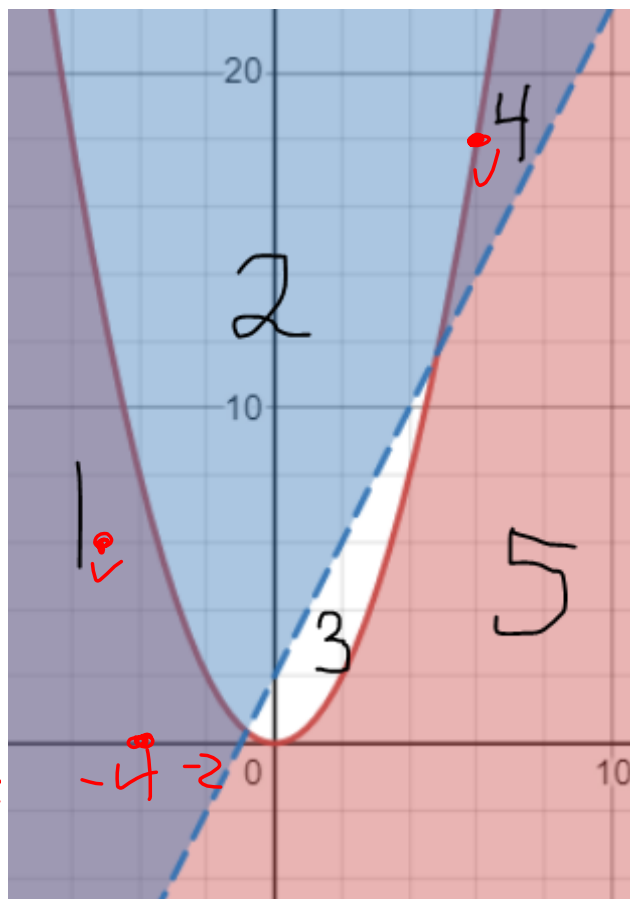
Solution Region: 1 + 4

2 Solution Points include:

(-4, 2) (3, 18)

Is (-5, 6) a solution? explain

Yes its in the overlapping shaded area



Summary

Objective: To be able to graph two inequalities in two variables on a coordinate plane and determine the solutions by shading. To be able to test a point in both equations to determine which region is a solution.

Virtue/Skill: These help to determine feasible solutions for companies' profit and cost margins.

Assignment:

Exit Question

Graph $5x - 2y \leq 6$

$y > -x + 1$

6-8 Skills Practice
Graphing Systems of Inequalities

Solve each system of inequalities by graphing.

1. $x > -1$
 $y \leq -3$

2. $y > 2$
 $x < -2$

3. $y > x + 3$
 $y \leq -1$

4. $x < 2$
 $y - x \leq 2$

5. $x + y \leq -1$
 $x + y \geq 3$

6. $y - x > 4$
 $x + y > 2$

7. $y > x + 1$
 $y \geq -x + 1$

8. $y \geq -x + 2$
 $y < 2x - 2$

9. $y < 2x + 4$
 $y \geq x + 1$

Write a system of inequalities for each graph.

10.
 $y \leq x + 2, y \geq x - 3$

11.
 $y > -x, y > x$

12.
 $y \geq x + 1, y < 1$

Chapter 6 59 Glencoe Algebra 1

Members of the swim team want to wash their hair. The bathroom has less than 5600 liters of water and at most 2.5 liters of shampoo.

$70L + 60S < 5600$ represents the number of long-haired members L and short-haired members S who can wash their hair with less than 5600 liters of water.

$0.02L + 0.01S \leq 2.5$ represents the number of long-haired members and short-haired members who can wash their hair with at most 2.5 liters of shampoo.

Does the bathroom have enough water and shampoo for 8 long-haired members and 7 short-haired members?

Yes