



## Graphing a System of Linear Inequalities

Students solve a system of two linear equations algebraically and are able to interpret the answer graphically. Students are able to solve a system of two linear inequalities in two variables and are able to sketch the solution sets.



## Steps for Graphing Systems of Linear Inequalities

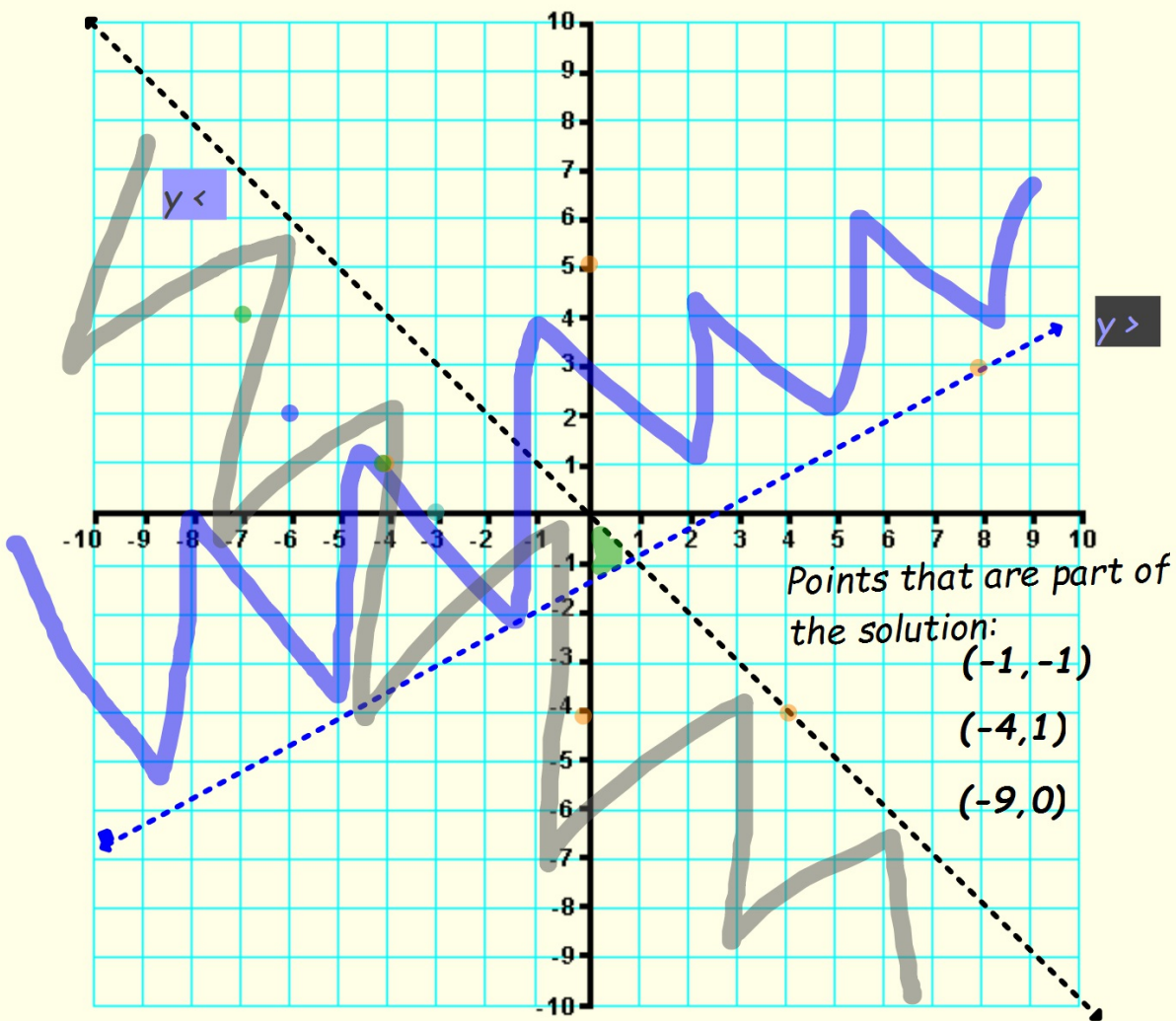
1) Graph each line onto the same  $x/ y$  axis.  
If the inequality is  $<$  or  $>$  make sure you use a dotted line.

2) The solution region is the region that is **TRUE** for both inequalities.

To determine which region to shade, choose a point from each of the 4 regions (3 regions in parallel lines). Substitute the  $x$  and  $y$  value into **BOTH** inequalities.

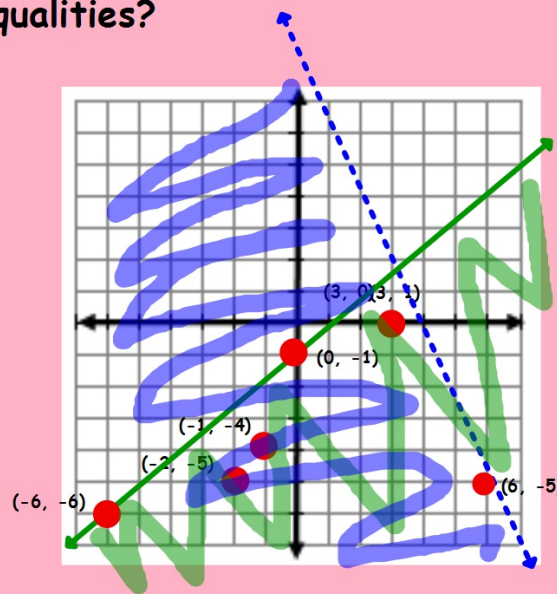
3) Shade the region that is **TRUE** for **BOTH**.





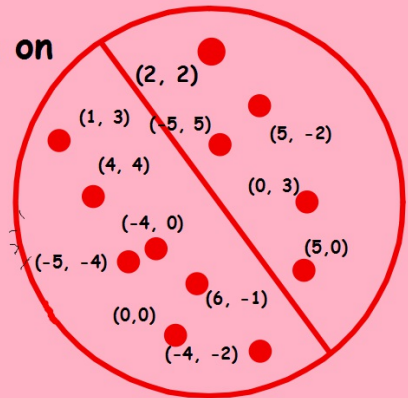
Which points are solutions of the system on linear inequalities?

Ex) 1

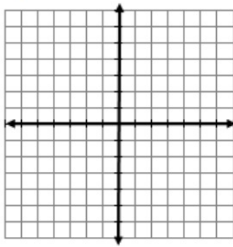


Region 3

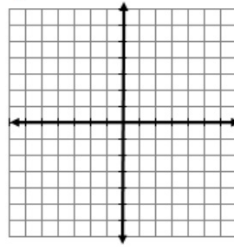
green:  $y \leq \frac{6}{7}x - 1$   
blue:  $y < -2x + 8$



$$y < 2x + 1$$

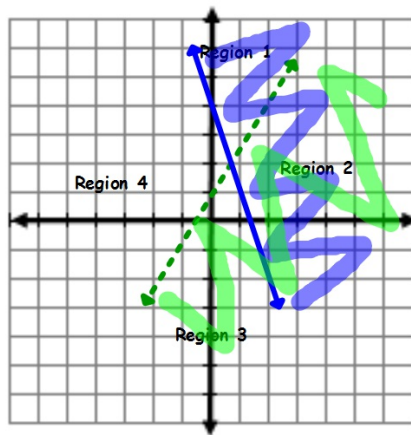


$$y \geq -3x + 4$$



Shade the solution region for each graph.

Ex 2)



Region 2

Q1 & 4

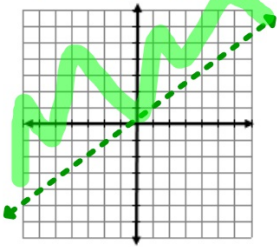
(2,1), (3,-1), (5,0)



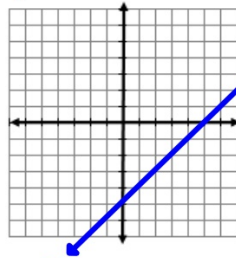
(2,0) (4,1) (3,-1)



$$y > (2/3)x$$

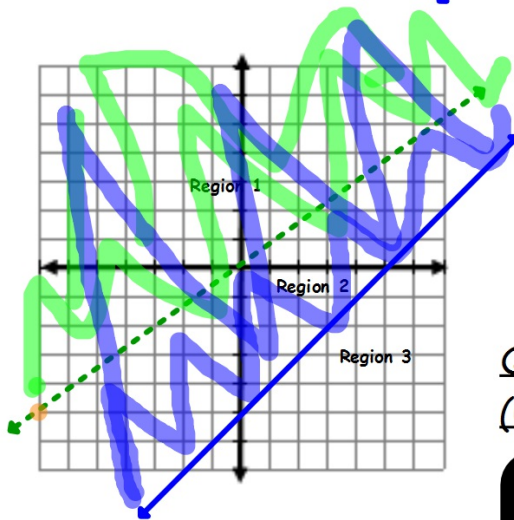


$$y \geq x - 5$$



Shade the solution region for each graph.

Ex 3)



Region 1

(2,3)

(7,7)

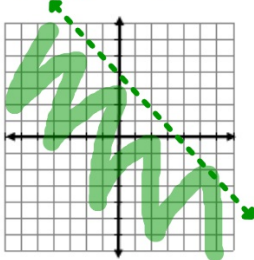
(-7,-4)

Q1, 2, and 3

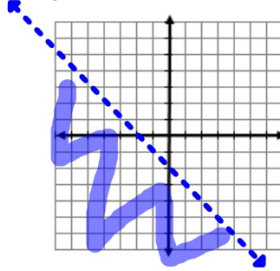
(0,1) (2,5) (-3,-1)



$$x + y < 4$$

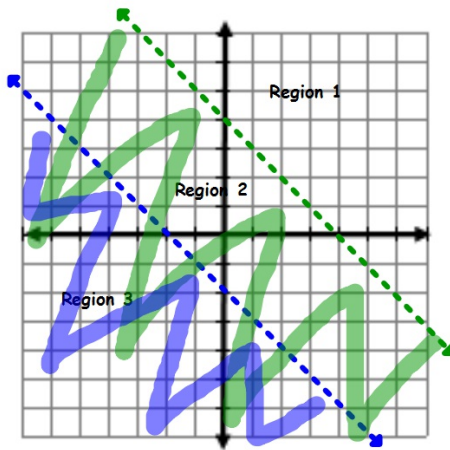


$$y < -x - 2$$



Shade the solution region for each graph.

Ex 4)



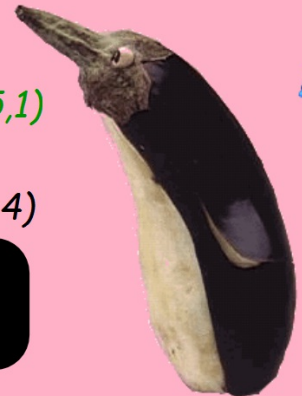
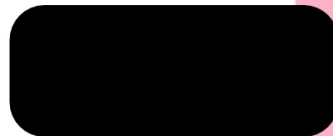
Shade the solution region for each graph.

*Region 3*

$(-3, -3)$   $(-5, -5)$   $(-5, 1)$

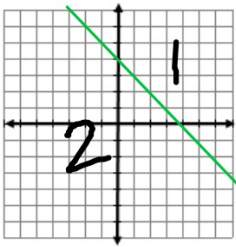
Q 2, 3, 4

$(-5, -1)$   $(0, -5)$   $(1, -4)$

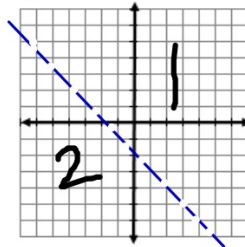




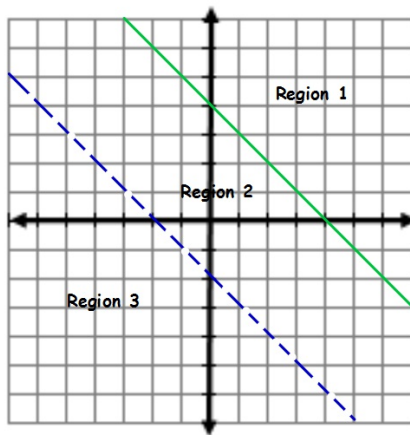
$$x + y \geq 4$$



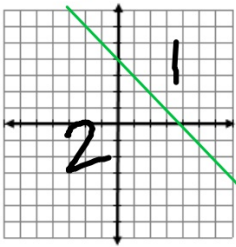
$$y < -x - 2$$



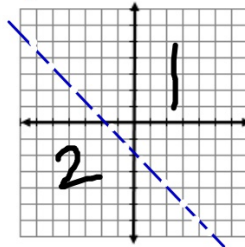
Shade the solution region for each graph.



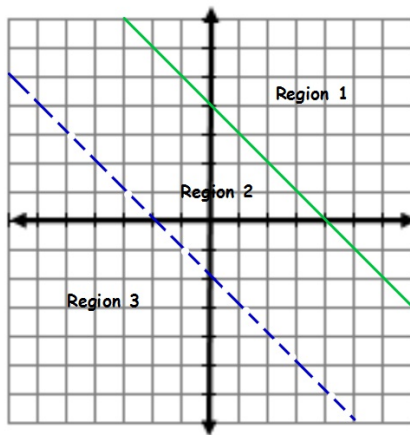
$$x + y \geq 4$$



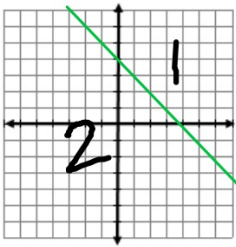
$$y < -x - 2$$



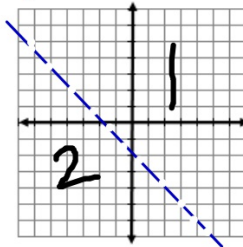
Shade the solution region for each graph.



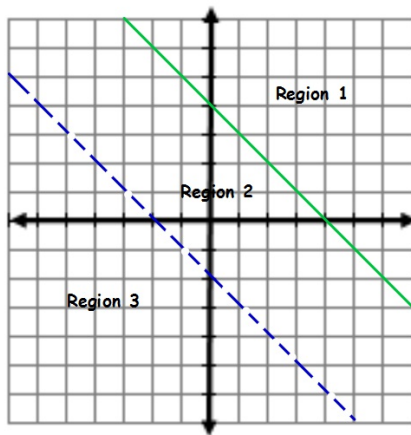
$$x + y \geq 4$$



$$y < -x - 2$$

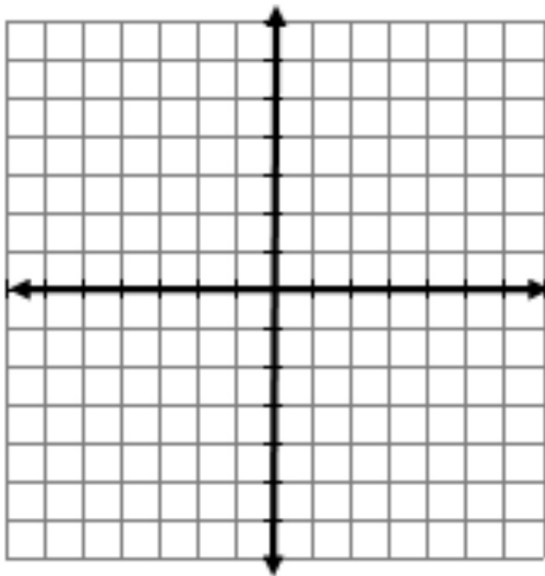


Shade the solution region for each graph.



Solve the system of linear inequalities by graphing.

$$2x - 3y > 12 \text{ and } x + y \leq 3$$

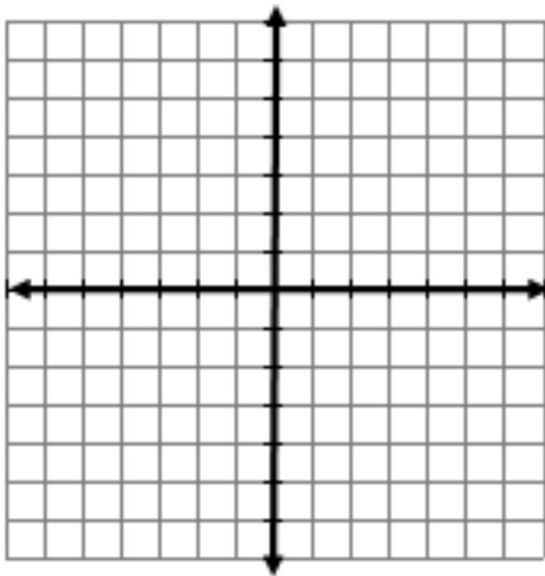


WARM UP



Solve the system of linear inequalities by graphing.

$$5x + y \geq 3 \text{ and } 3x - y \geq 3$$



*Practice*





**Example 1**

Solve the following system by graphing:

$$x \geq -2$$

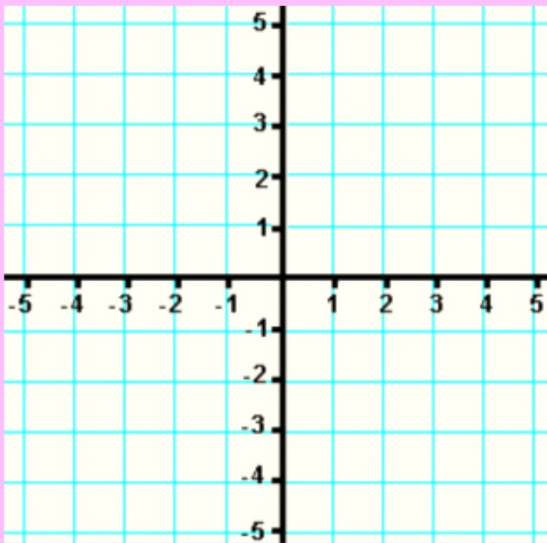
$$2x + 2y < 4$$

Name a point in the solution region.

**Example 2**

Solve the system by graphing.

$$4y \geq 6x \quad -3x + 2y \leq -6$$



**Pull here**

Explain why  $(0, 0)$  was not tested in the first equation.



What is the solution when a system of inequalities is graphed?

- A** All shaded regions
- B** Where the shaded parts overlap
- C** Where the shaded parts do not overlap
- D** There are none
- E** None of the Above
- F** I Don't Know