

Graphing a Linear Inequality Notes

Objective: Determine the solution to a system of linear inequalities by graphing.

Graph: $y \geq 2x - 5$

Step 1: Put the inequality in slope-intercept form

Step 2: Graph the inequality (dashed or solid?)

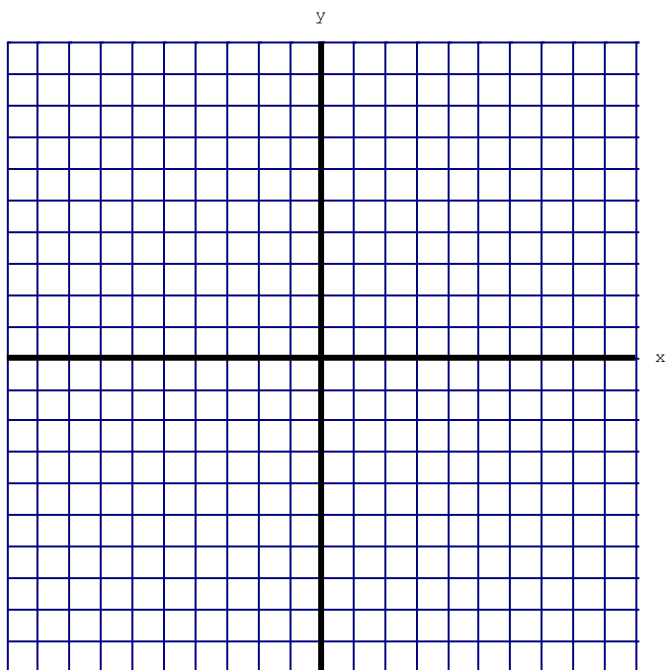
Step 3: Figure out where to shade by picking a test point. A common test point to use is $(0, 0)$.

If the test point gives a **true** statement you shade the **half** the test point is in.

If the test point gives a **false** statement you shade the **opposite half** the test point is in.

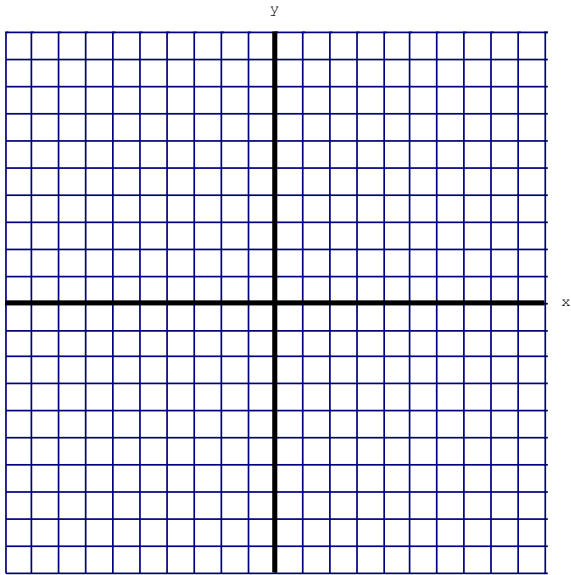
You try:

Graph: $2x + 4y < 8$

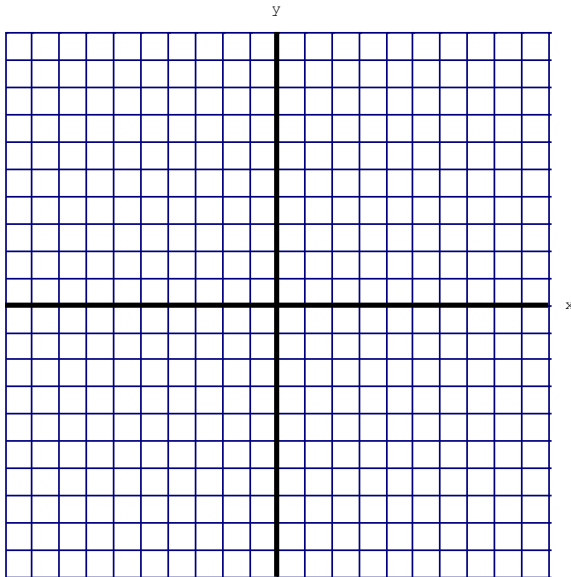


Examples:

1. Graph the inequality $y > -\frac{1}{2}x + 5$. What are some solutions to the inequality? (,) (,) (,)



2. Graph the inequality $y < x + 2$. What are some solutions to the inequality? (,) (,) (,)



3. Looking at both graphs:

- a. Are there any solutions that work for both inequalities?

Give three examples (,) (,) (,)

- b. Are there any solutions that work for 1 inequality but not the other?

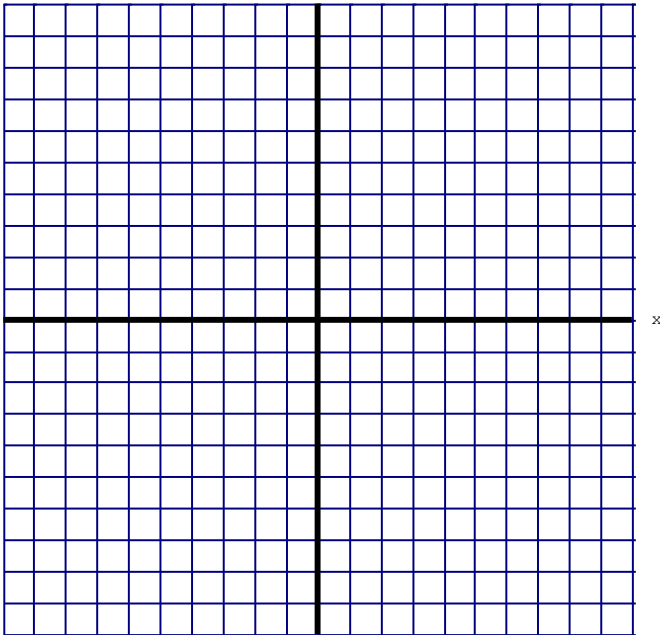
Give three examples (,) (,) (,) and write the correct inequality below each answer.

Graphing a System of Inequalities Notes

Graph: $y \leq 5x + 2$

$y > x - 2$

y



Step 1: Put both inequalities in slope-intercept form

Step 2: Graph each inequality (dashed or solid?)

Step 3: Figure out where to shade by picking a test point. A common test point to use is (0, 0).

Test point must make **both** equations **true**.

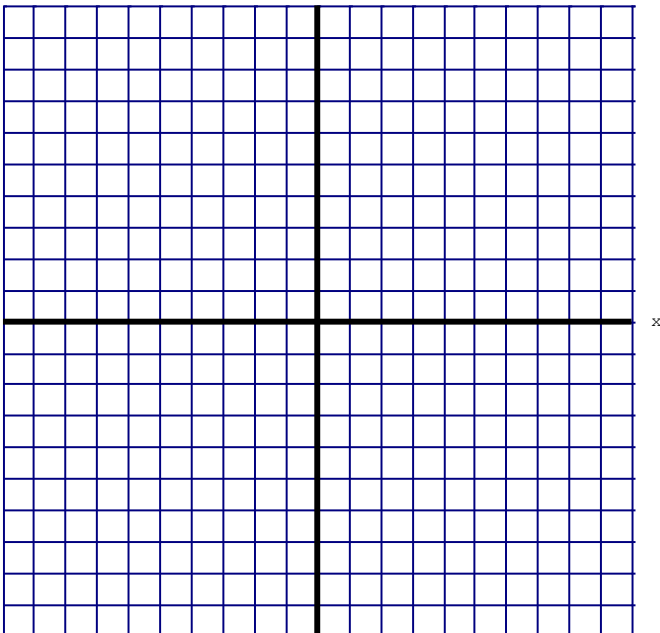
- Method 1: Guess and check each of the four regions
- Method 2: Shade both regions individually and the overlap is your answer

You try:

Graph: $2x + y > 3$

$4x - 5y < 5$

y

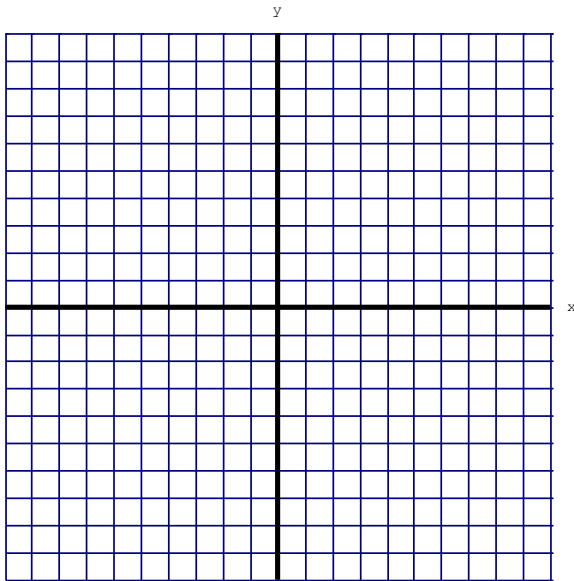


Examples:

4. Graph the following system of inequalities on the same graph. Use a different color for each.

$$x + y \geq 3$$

$$y \leq -x + 5$$

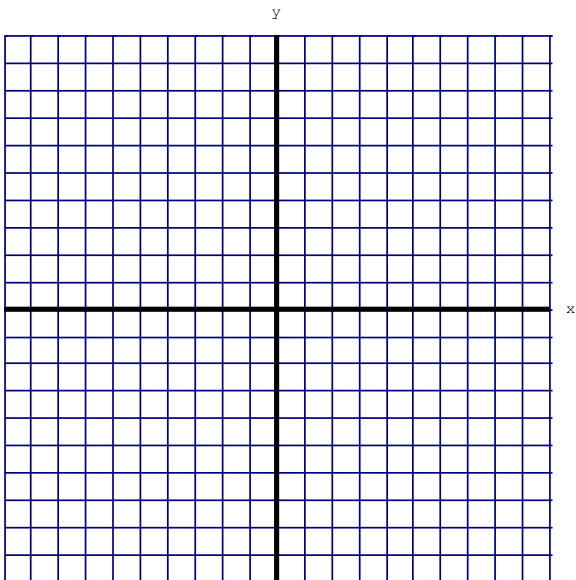


a. Give three coordinates that are solutions to the system. (,) (,) (,)

b. Give three coordinates that are not solutions to the system. (,) (,) (,)

c. Is a coordinate on a line a solution?

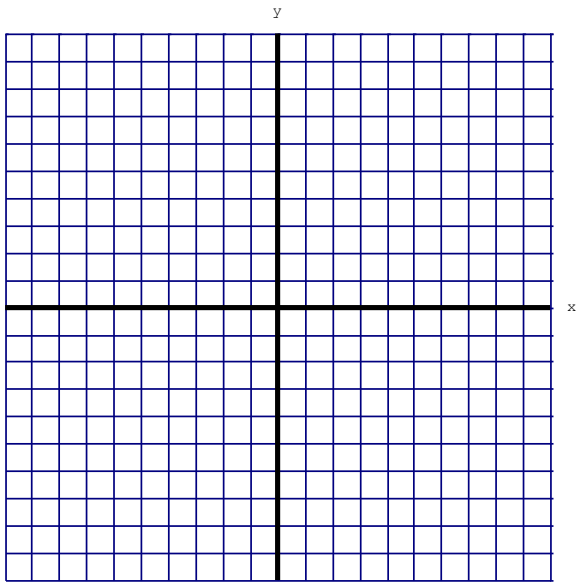
5. Graph the following on the same graph and give three solutions. (,) (,) (,)



$$2x + 3y < 6$$

$$x + 5y > 5$$

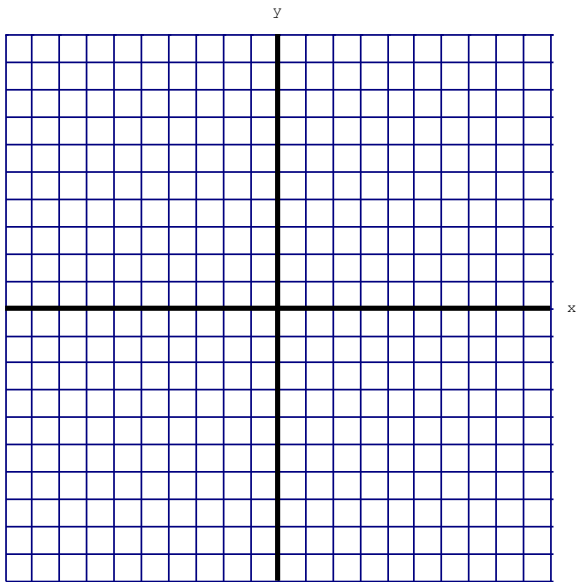
6. Graph the following on the same graph and give three solutions. (,) (,) (,)



$$5x - 2y < 2$$

$$2x + 6y \leq 18$$

7. Graph the following on the same graph and give three solutions. (,) (,) (,)



$$3x - 4y > 20$$

$$y > \frac{3}{4}x + 1$$

Summary of Systems of Linear Inequalities

*The solution to a system of linear equations is the _____ of intersection.

*The solution to a system of linear inequalities is the _____ of intersection.

•In order to solve a system of linear *inequalities*, you **MUST** graph.

Steps for Graphing Linear Inequalities and a System of Linear Inequalities

- 1.) Solve each inequality for y .
 - ❖ **DON'T FORGET**: Flip the sign if you multiply or divide by a negative number!
- 2.) Graph each line.
 - ❖ $>$ and $<$ _____ line
 - ❖ \geq and \leq _____ line
- 3.) Shade each line.
 - ❖ For $>$ and \geq shade _____ the line
 - ❖ For $<$ and \leq shade _____ the line
- 4.) The "solution region" is the area where **all** the shadings overlap.
 - ❖ Dashed lines are/are not part of the solution.
 - ❖ Solid lines are/are not part of the solution.

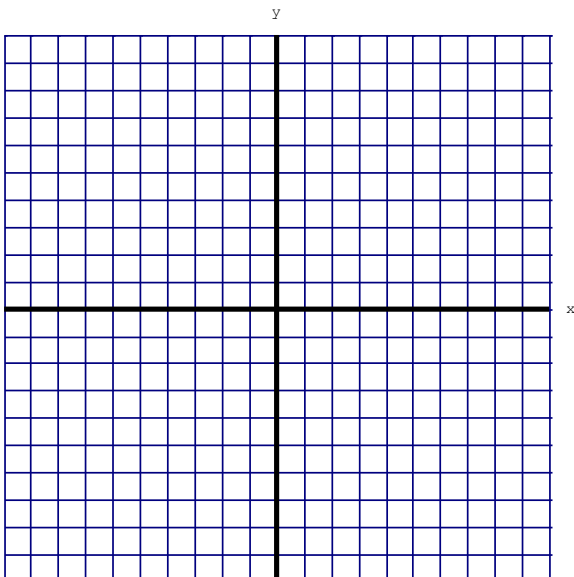
Graph the system of inequalities then determine which of the following orders pairs would be solutions:

$$4x + 6y > 36$$

$$-12x + 3y \leq -9$$

Circle the ordered pairs that are solutions.

Cross off the ordered pairs that are not solutions.



- a. (6,2)
- b. (10,5)
- c. (-5,10)
- d. (0,-3)
- e. (-10,5)
- f. (5,-10)
- g. (2,5)
- h. (-9,0)