

# Assignment

## Write

Describe how you know which region, if any, represents the solution to a system of linear inequalities.

## Remember

The solution of a system of linear inequalities is the intersection of the solutions to each inequality. Every point in the intersection region satisfies all inequalities in the system.

## Practice

- Samuel is remodeling his basement. One part of the planning involves the flooring. He knows that he would like both carpet and hardwood, but isn't sure how much of each he will use. The most amount of flooring area he can cover is 2000 square feet. The carpet is \$4.50 per square foot and the hardwood is \$8.25 per square foot. Both prices include labor costs. Samuel has budgeted \$10,000 for the flooring.
  - Write a system of inequalities to represent the maximum amount of flooring needed and the maximum amount of money Samuel wants to spend.
  - One idea Samuel has is to make two rooms—one having 400 square feet of carpeting and the other having 1200 square feet of hardwood. Determine whether this amount of carpeting and hardwood are solutions to the system of inequalities. Explain your reasoning in terms of the problem situation.
  - Graph this system of inequalities.
  - Determine the intersection point of the two lines. Is this a solution to this system of inequalities in terms of the problem situation?
  - Identify two different solutions to the system of inequalities. Explain what the solutions represent in terms of the problem situation.
  - Determine one combination of amounts of carpet and hardwood that is not a solution for the system of inequalities. Explain your reasoning.

- Solve each system of linear inequalities.

a. 
$$\begin{cases} -x + 3y \leq -6 \\ -5x + 3y \geq 6 \end{cases}$$

b. 
$$\begin{cases} -x + 2y < 6 \\ 3x + 2y \leq 2 \end{cases}$$

c. 
$$\begin{cases} -x + 3y \leq 18 \\ x \leq 3 \end{cases}$$

## Stretch

- Is it possible to create a system of inequalities that has no solutions? If so, create one and explain how the graph would show no solutions. If not, explain why.
- Is it possible to create a system of two inequalities that has only one solution? If so, create one. If not, explain why.
- Is it possible to create a system of three inequalities that has only one solution? If so, sketch a graph to show the solution. If not, explain why.

## Review

1. Determine whether each equation has one solution, no solution, or infinite solutions.

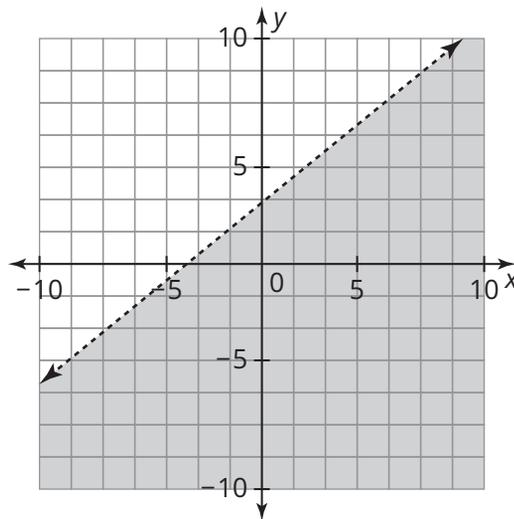
a.  $24x - 22 = -3(1 - 8x)$

b.  $-3(4a + 3) + 2(12a + 2) = 43$

c.  $4(x + 1) = 6x + 4 - 2x$

2. Graph  $3x + y \leq 7$  on a coordinate plane.

3. Write a linear inequality for the graph.



4. A new workout gym opens up down the street from your house. Below are their total membership numbers for the first months of business.

Month	January	February	March	April	May
Number of Members	120	190	290	370	450

a. Write the equation of the regression line for the data.

b. Use the equation to predict the gym's total membership at the end of the year.