



3.  $|4p| \leq 16$

$$\frac{4p}{4} \geq \frac{-16}{4}$$

$$p \geq -4$$

or  
-4

4.  $|m - 4| > 6$

$$m - 4 > 6$$

$$+4 \quad +4$$

$$m > 10$$

$$m - 4 < -6$$

$$+4 \quad +4$$

$$m < -2$$



**Solve the inequality.**

1.  $2y + 8 \leq 16$

2.  $10 - q \geq 14$

3.  $4p \leq 16$

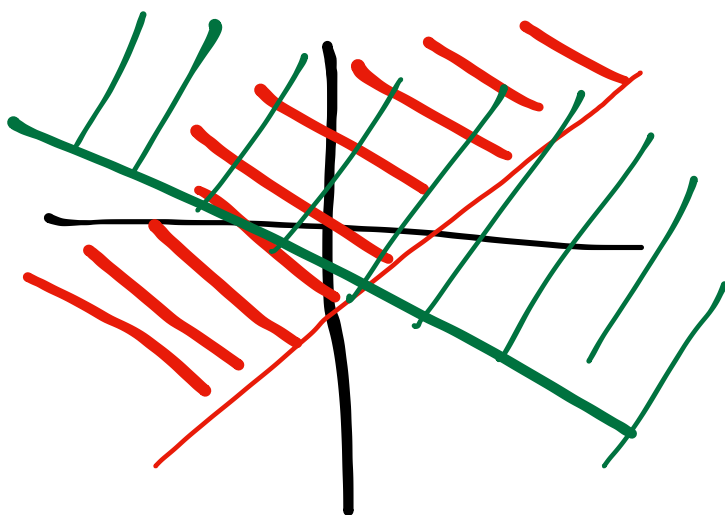
4.  $10(2g + 3) \geq 10 \cdot 3g$

5.  $7(x + 6) \leq 2(5x)$

6.  $z + (-8) > 6$

## Essential Question

How can you graph a system of linear inequalities?

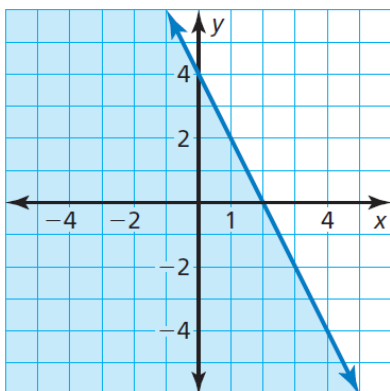


**Work with a partner.** Match each linear inequality with its graph.  
Explain your reasoning.

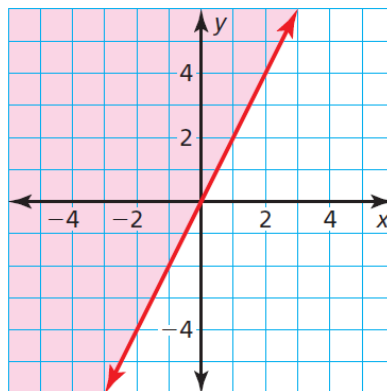
$$2x + y \leq 4 \text{ Inequality 1}$$

$$2x - y \leq 0 \text{ Inequality 2}$$

A.



B.



**Work with a partner.** Consider the linear inequalities given in Exploration 1.

$$2x + y \leq 4 \text{ Inequality 1}$$

$$2x - y \leq 0 \text{ Inequality 2}$$

**a.** Use two different colors to graph the inequalities in the same coordinate plane. What is the result?

**b.** Describe each of the shaded regions of the graph. What does the unshaded region represent?

Tell whether each ordered pair is a solution of the system of linear inequalities

$$y < 2x + 1$$

$$y \geq x + 1$$

a. (3, 4)

ties



**Tell whether the ordered pair is a solution of the system of linear inequalities.**

1.  $(-1, 5)$ ;  $y < 5$   
 $y > x - 4$

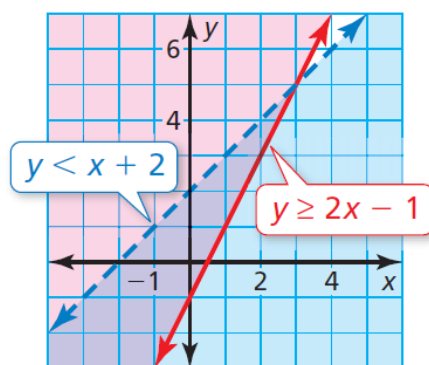
2.  $(1, 4)$ ;  $y \geq 3x + 1$   
 $y > x - 1$

## Core Concept

### Graphing a System of Linear Inequalities

**Step 1** Graph each inequality in the same coordinate plane.

**Step 2** Find the intersection of the half-planes that are solutions of the inequalities. This intersection is the graph of the system.





Graph the system of linear inequalities.

$$y \leq 3 \text{ Inequality 1}$$

$$y > x + 2 \text{ Inequality 2}$$

Graph the system of linear inequalities.

$$2x + y < -1 \text{ Inequality 1}$$

$$2x + y > 3 \text{ Inequality 2}$$

**Graph the system of linear inequalities.**

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

$$x + y \leq 0$$

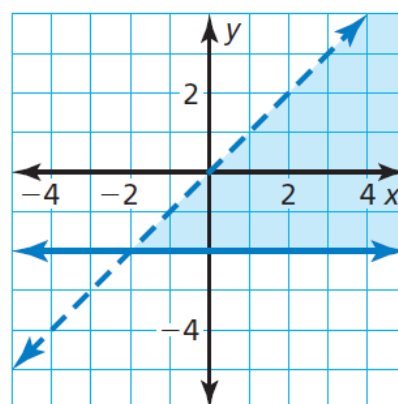
**4.**  $y > 2x - 3$

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

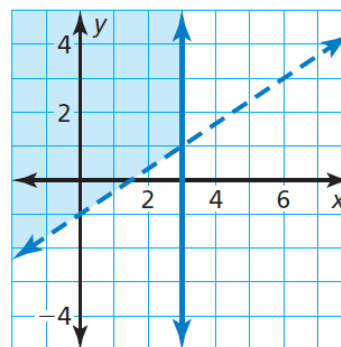
**5.**  $-2x + y < 4$

$$2x + y > 4$$

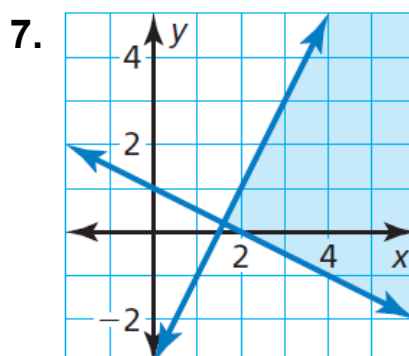
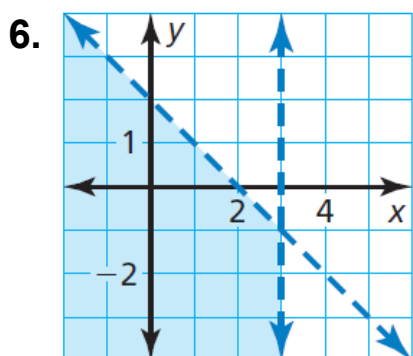
Write a system of linear inequalities represented by the graph.



Write a system of linear inequalities represented by the graph.



Write a system of linear inequalities represented by the graph.



You have at most 8 hours to spend at the mall and at the beach. You want to spend at least 2 hours at the mall and more than 4 hours at the beach. Write and graph a system that represents the situation. How much time can you spend at each location?

8. Name another solution of Example 6.

9. **WHAT IF?** You want to spend at least 3 hours at the mall. How does this change the system? Is  $(2.5, 5)$  still a solution? Explain.



- Name an ordered pair that is a solution of the system of linear inequalities.

- Name an ordered pair that is not a solution of the system of linear inequalities.

