

5.7

Systems of Linear Inequalities

For use with Exploration 5.7

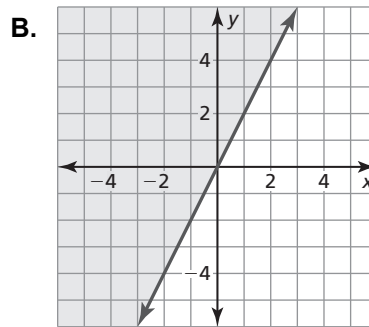
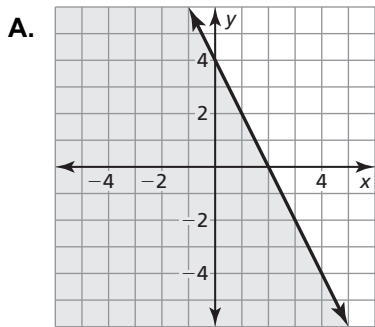
Essential Question How can you graph a system of linear inequalities?

1 EXPLORATION: Graphing Linear Inequalities

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

$2x + y \leq 4$ Inequality 1

$2x - y \leq 0$ Inequality 2



2 EXPLORATION: Graphing a System of Linear Inequalities

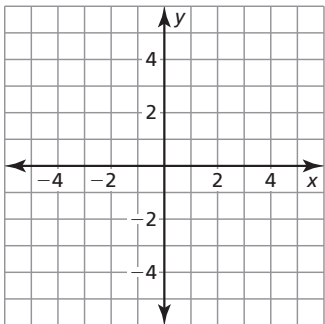
Go to BigIdeasMath.com for an interactive tool to investigate this exploration.

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

$2x + y \leq 4$ Inequality 1

$2x - y \leq 0$ Inequality 2

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



5.7 Systems of Linear Inequalities (continued)

2 **EXPLORATION:** Graphing a System of Linear Inequalities (continued)

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

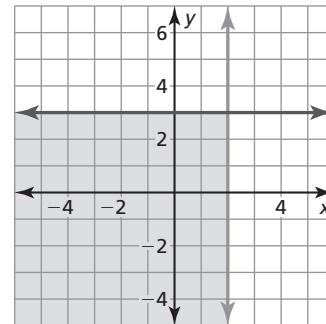
Communicate Your Answer

- 3. How can you graph a system of linear inequalities?

- 4. When graphing a system of linear inequalities, which region represents the solution of the system?

- 5. Do you think all systems of linear inequalities have a solution? Explain your reasoning.

- 6. Write a system of linear inequalities represented by the graph.



5.7**Notetaking with Vocabulary**

For use after Lesson 5.7

In your own words, write the meaning of each vocabulary term.

system of linear inequalities

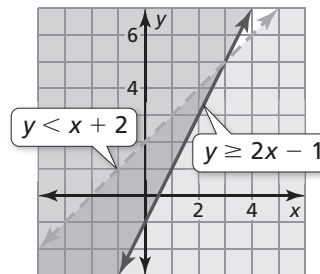
solution of a system of linear inequalities

graph of a system of linear inequalities

Core Concepts**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.



Notes:

5.7 Notetaking with Vocabulary (continued)

Extra Practice

In Exercises 1–4, tell whether the ordered pair is a solution of the system of linear inequalities.

1. $(0, 0); y > 2$
 $y < x - 2$

2. $(-1, 1); y < 3$
 $y > x - 4$

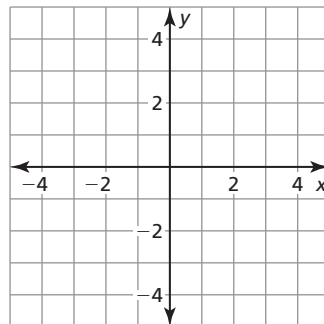
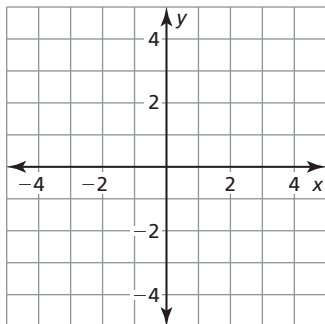
3. $(2, 3); y \geq x + 4$
 $y \leq 2x + 4$

4. $(0, 4); y \leq -x + 4$
 $y \geq 5x - 3$

In Exercises 5–8, graph the system of linear inequalities.

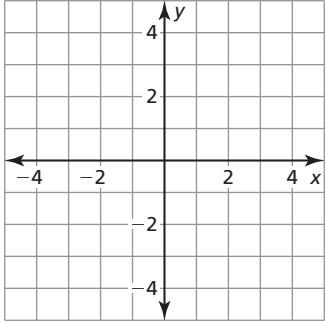
5. $y > -2$
 $y \leq 3x$

6. $y < 3$
 $x < 2$

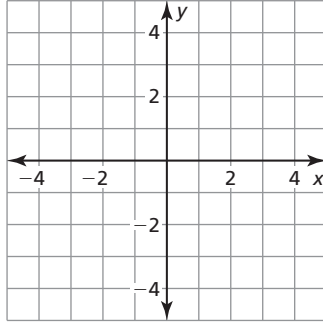


5.7 Notetaking with Vocabulary (continued)

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



8. $2x + 3y < 6$
 $y - 1 \geq -2x$



In Exercises 9–12, write a system of linear inequalities represented by the graph.

