



4-4

Linear Inequalities in Two Variables



MODEL & DISCUSS

A flatbed trailer carrying a load can have a maximum total height of 13 feet, 6 inches. The photograph shows the height of the trailer before a load is placed on top. What are the possible heights of loads that could be carried on the trailer?



- A. What type of model could represent this situation? Explain.
- B. Will the type of model you chose show all the possible heights of the loads without going over the maximum height? Explain.
- C. **Reason** Interpret the solutions of the model. How many solutions are there? Explain. © MP.2

HABITS OF MIND

Make Sense and Persevere Suppose that the maximum load is transferred to a different flat bed. If the new flat bed has a maximum total height of 14 feet, what should the height of the new flatbed be to ensure the flatbed and the load do not exceed the maximum total height? © MP.1

**EXAMPLE 1** **Try It!** Understand an Inequality in Two Variables

1. Describe the graph of the solutions of each inequality.

a. $y < -3x + 5$.

b. $y \geq -3x + 5$

EXAMPLE 2 **Try It!** Rewrite an Inequality to Graph It

2. Will the Science Club meet their goal if they sell 30 T-shirts and 90 key chains? Explain in terms of the graph of the inequality.

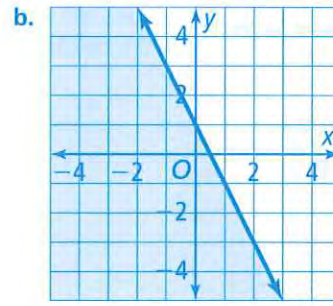
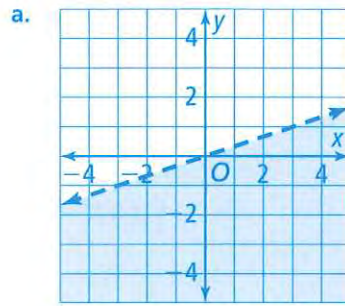
HABITS OF MIND

Communicate Precisely How is the graph of $y < 3x$ similar to the graph of $y \geq 3x$? How are the two graphs different? © MP.6



EXAMPLE 3 **Try It!** Write an Inequality From a Graph

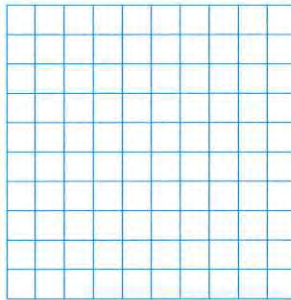
3. What inequality does each graph represent?



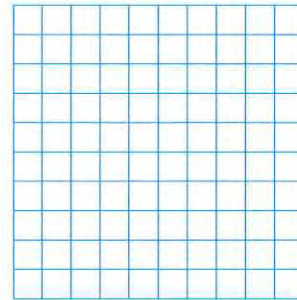
EXAMPLE 4 **Try It!** Inequalities in One Variable in the Coordinate Plane

4. Graph each inequality in the coordinate plane.

a. $y > -2$



b. $x \leq 1$



HABITS OF MIND

Use Appropriate Tools Name two ways you could check if a point is a solution of an inequality. © MP.5

Do You UNDERSTAND?

1. **ESSENTIAL QUESTION** How does the graph of a linear inequality in two variables help you identify the solutions of the inequality?

2. **Communicate Precisely** How many solutions does a linear inequality in two variables have? **MP.6**

3. **Vocabulary** In what form do you write one of the *solutions of an inequality in two variables*?

4. **Error Analysis** A student claims that the inequality $y < 1$ cannot be graphed on a coordinate grid since it has only one variable. Explain the error the student made. **MP.3**

Do You KNOW HOW?

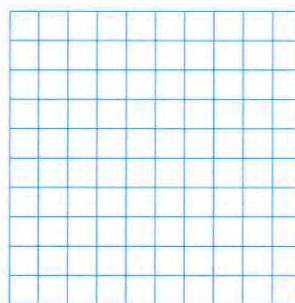
Tell whether each ordered pair is a solution of the inequality $y > x + 1$.

5. (0, 1)

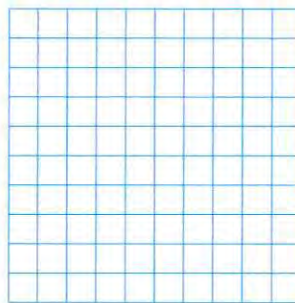
6. (3, 5)

Graph each inequality in the coordinate plane.

7. $y \geq 2x$



8. $y < x - 2$



9. What inequality is shown by the graph?

