6-4 Linear Inequalities
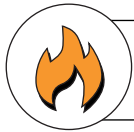
OBJECTIVE: I can graph linear inequalities in two variables to use linear inequalities when modeling real-world situations

Warm-Up

Paperback
$2.50

Hardcover
$4.50

You are buying paperback and hardcover books at a book sale. You can spend at most $20. What are the possible combinations of paperback and hardcover books that you can buy? Explain.

Essential Understanding A linear inequality in two variables has an infinite number of solutions. These solutions can be represented in the coordinate plane as the set of all points on one side of a boundary line.

A linear inequality in two variables, such as y > x – 3, can be formed by replacing the equal sign in a linear equation with an inequality symbol. A solution of an inequality in two variables is an ordered pair that makes the inequality true.

#1 Identifying Solutions of a Linear Inequality
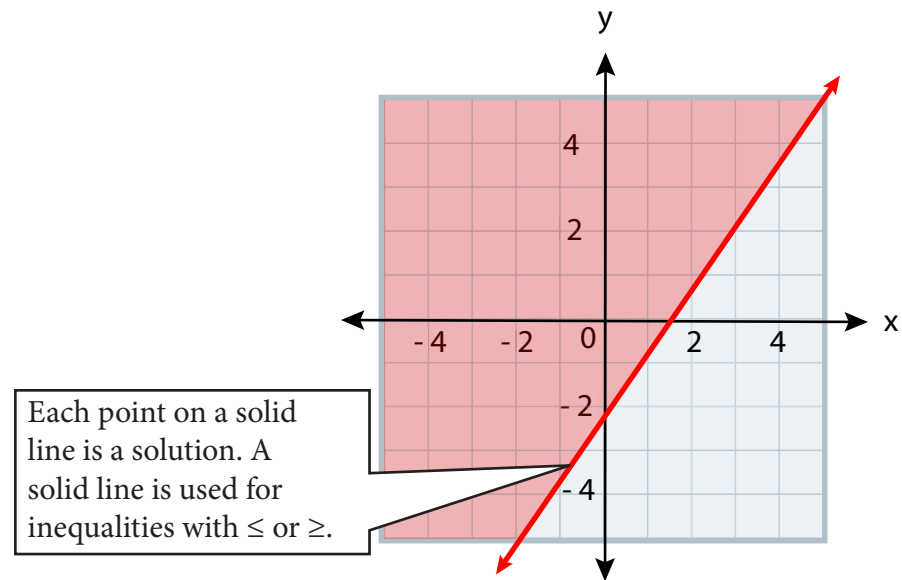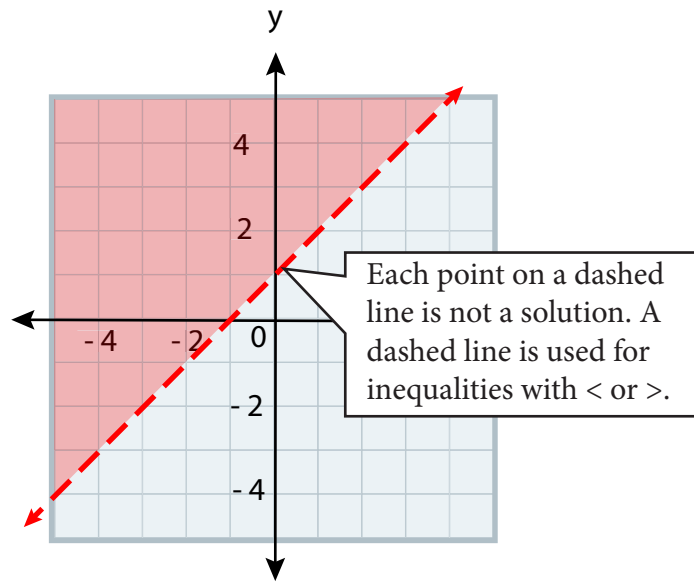
Is the ordered pair a solution of y > x – 3?

A (1, 2)

B (–3, –7)

1. Is (3, 6) a solution of $y \leq \frac{2}{3}x + 4$?

The graph of a linear inequality in two variables consists of all points in the coordinate plane that represent solutions. The graph is a region called a half-plane that is bounded by a line. All points on one side of the boundary line are solutions, while all points on the other side are not solutions.
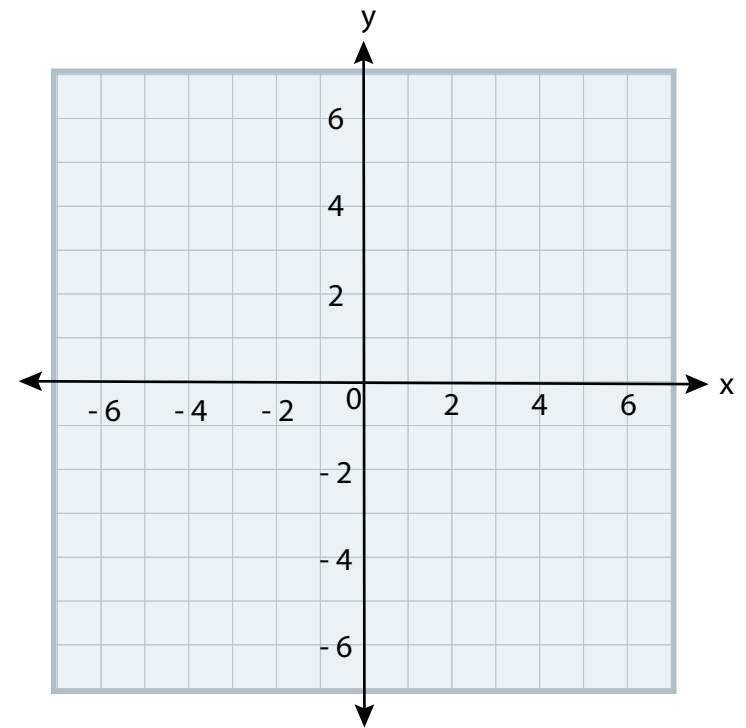
Each point on a dashed line is not a solution. A dashed line is used for inequalities with < or >.

Each point on a solid line is a solution. A solid line is used for inequalities with ≤ or ≥.
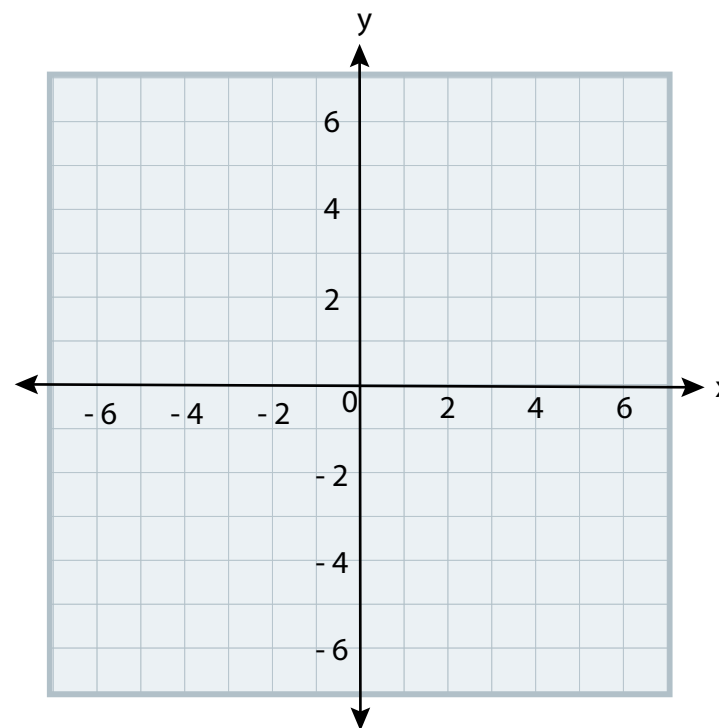
Example #2 Graphing an Inequality in Two Variables

What is the graph of y > x – 2?

What is the graph of $y \le \frac{1}{2}x + 1$?

Example #3 Graphing a Linear Inequality in One Variable
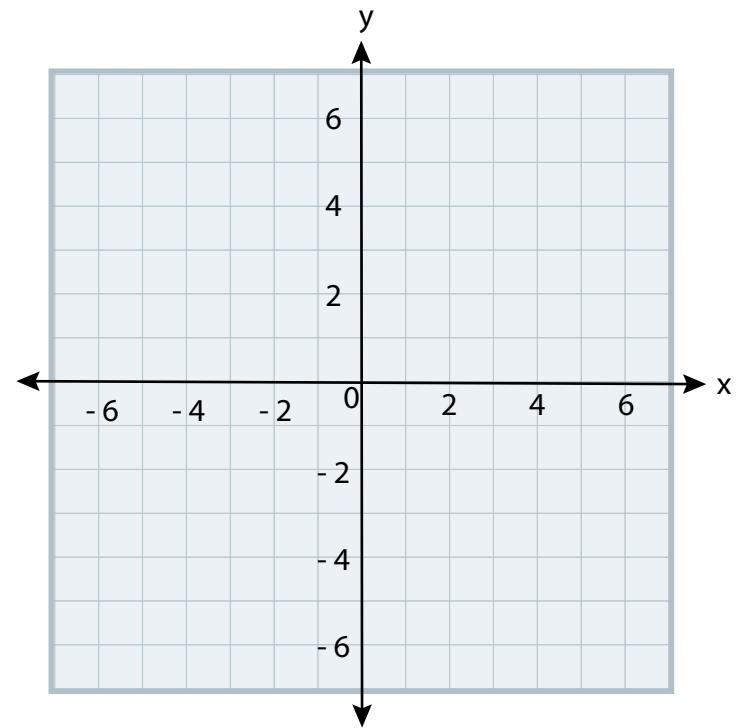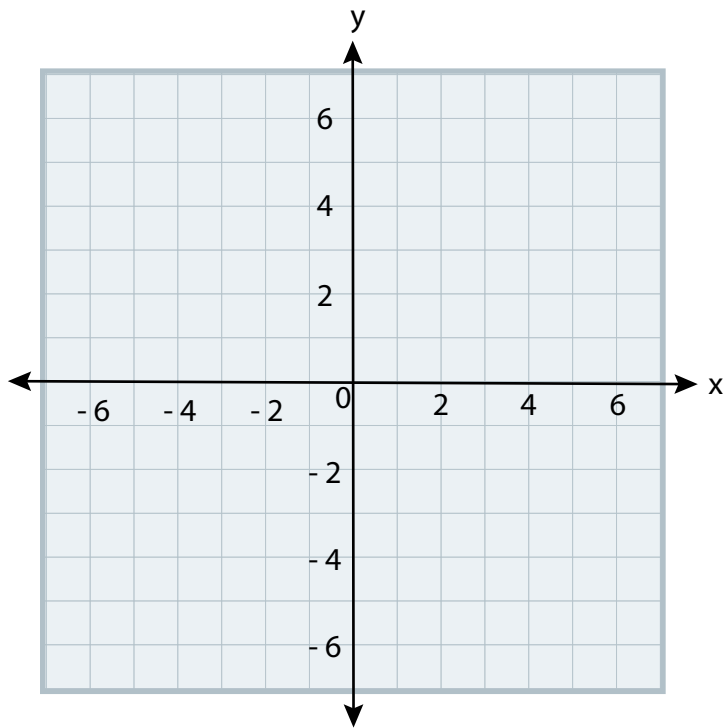
What is the graph of each inequality in the coordinate plane?

A x > −1
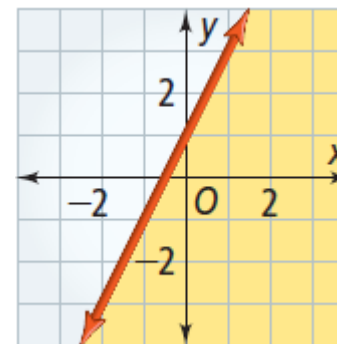
B y ≥ 2

3. What is the graph of each inequality?

A $x < -5$

B $y \leq 2$

Example #4 Writing an Inequality From a Graph

Write an inequality that represents the graph at the right?

5. You are writing an inequality from a graph. The boundary line is dashed and has slope $\frac{1}{3}$ and y-intercep intercept -2. The area above the line is shaded. What inequality should you write?