Tell whether the value is a solution of the inequality.

1. $4x > 11;\ x = 3$

2. $16 \geq 4y;\ y = 4$

3. $17x \geq 15;\ x = 0$

4. $-7x < 9;\ x = 6$

5. $-7b < 25;\ b = -4$

6. $x + \frac{2}{9} > 0;\ x = -1$

Graph each equation.

1. $y = 3x - 4$

2. $y = x + 1$

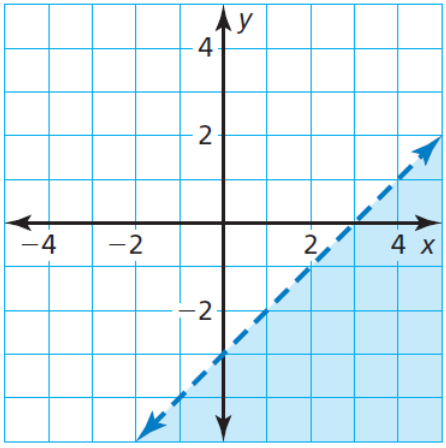
3. $4x-2y = 8$

Essential Question

How can you graph a linear inequality in two variables?

Work with a partner.

a. Write an equation represented by the dashed line.



b. The solutions of an inequality are represented by the shaded region. In words, describe the solutions of the inequality.

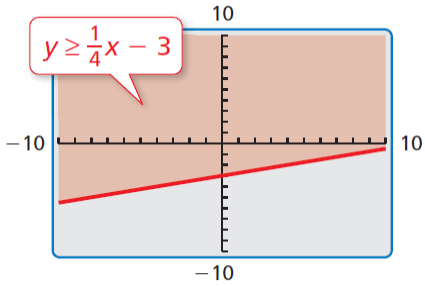
c. Write an inequality represented by the graph. Which inequality symbol did you use? Explain your reasoning.

Work with a partner.

Use a graphing calculator to graph $y \geq \frac{1}{4}x - 3$.

a. Enter the equation $y = \frac{1}{4}x - 3$ into your calculator.

b. The inequality has the symbol ≥. So, the region to be shaded is above the graph of $y = \frac{1}{4}x - 3$, as shown. Verify this by testing a point in this region, such as (0, 0), to make sure it is a solution of the inequality.



Because the inequality symbol is *greater than or equal to*, the line is solid and not dashed. Some graphing calculators always use a solid line when graphing inequalities. In this case, you have to determine whether the line should be solid or dashed, based on the inequality symbol used in the original inequality.

Work with a partner. Graph each linear inequality in two variables. Explain your steps. Use a graphing calculator to check your graphs.

a. $y > x + 5$ **b.** $y \leq -\frac{1}{2}x + 1$ **c.** $y \geq -x - 5$

Tell whether the ordered pair is a solution of the inequality.

a. $2x + y < -3$; $(-1, 9)$ **b.** $x - 3y \geq 8$; $(2, -2)$

Tell whether the ordered pair is a solution of the inequality.

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

2. $4x - y \geq 5$; $(0, 0)$

3. $5x - 2y \leq -1$; $(-4, -1)$

4. $-2x - 3y < 15$; $(5, -7)$

Core Concept

Graphing a Linear Inequality in Two Variables

Step 1 Graph the boundary line for the inequality. Use a dashed line for $<$ or $>$. Use a solid line for $\leq$ or $\geq$.

Step 2 Test a point that is not on the boundary line to determine whether it is a solution of the inequality.

Step 3 When the test point is a solution, shade the half-plane that contains the point. When the test point is *not* a solution, shade the half-plane that does *not* contain the point.

Graph $y \leq 2$ in a coordinate plane.

Graph $-x + 2y > 2$ in a coordinate plane.

Graph the inequality in a coordinate plane.

5. $y > -1$

6. $x \leq -4$

7. $x + y \leq -4$

8. $x - 2y < 0$

You can spend at most $10 on grapes and apples for a fruit salad. Grapes cost $2.50 per pound, and apples cost $1 per pound. Write and graph an inequality that represents the amounts of grapes and apples you can buy. Identify and interpret two solutions of the inequality.

9. You can spend at most $12 on red peppers and tomatoes for salsa. Red peppers cost $4 per pound, and tomatoes cost $3 per pound. Write and graph an inequality that represents the amounts of red peppers and tomatoes you can buy. Identify and interpret two solutions of the inequality.

Phone Message: Write a brief phone message that you would leave for a friend who missed today's class. Explain how to graph a linear inequality in two variables.