

5.5**Solving Equations by Graphing**

For use with Exploration 5.5

Essential Question How can you use a system of linear equations to solve an equation with variables on both sides?

1 EXPLORATION: Solving an Equation by Graphing

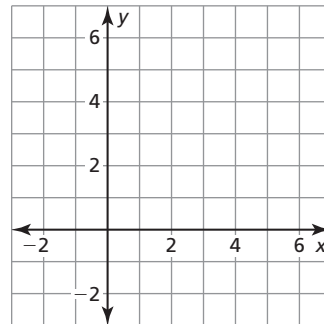
Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Solve $2x - 1 = -\frac{1}{2}x + 4$ by graphing.

- a. Use the left side to write a linear equation. Then use the right side to write another linear equation.

- b. Graph the two linear equations from part (a). Find the x -value of the point of intersection. Check that the x -value is the solution of

$$2x - 1 = -\frac{1}{2}x + 4.$$



- c. Explain why this “graphical method” works.

2 EXPLORATION: Solving Equations Algebraically and Graphically

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

Work with a partner. Solve each equation using two methods.

Method 1 Use an algebraic method.

Method 2 Use a graphical method.

Is the solution the same using both methods?

a. $\frac{1}{2}x + 4 = -\frac{1}{4}x + 1$

b. $\frac{2}{3}x + 4 = \frac{1}{3}x + 3$

5.5 Solving Equations by Graphing (continued)**2 EXPLORATION: Solving Equations Algebraically and Graphically (continued)**

c. $-\frac{2}{3}x - 1 = \frac{1}{3}x - 4$

d. $\frac{4}{5}x + \frac{7}{5} = 3x - 3$

e. $-x + 2.5 = 2x - 0.5$

f. $-3x + 1.5 = x + 1.5$

Communicate Your Answer

- How can you use a system of linear equations to solve an equation with variables on both sides?
- Compare the algebraic method and the graphical method for solving a linear equation with variables on both sides. Describe the advantages and disadvantages of each method.

5.5**Notetaking with Vocabulary**

For use after Lesson 5.5

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

absolute value equation

Core Concepts**Solving Linear Equations by Graphing**

Step 1 To solve the equation $ax + b = cx + d$, write two linear equations.

$$\begin{array}{c} ax + b = cx + d \\ \left(y = ax + b \right) \longrightarrow \uparrow \quad \text{and} \quad \uparrow \longrightarrow \left(y = cx + d \right) \end{array}$$

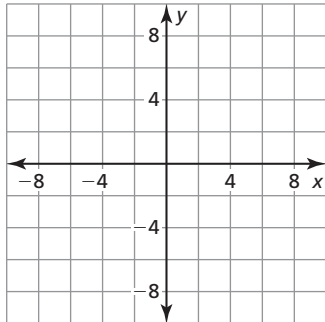
Step 2 Graph the system of linear equations. The x -value of the solution of the system of linear equations is the solution of the equation $ax + b = cx + d$.

Notes:

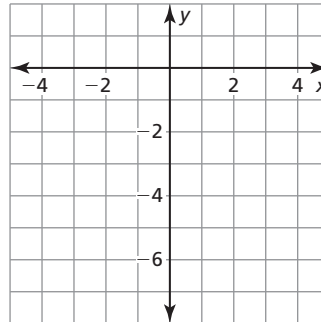
5.5 Notetaking with Vocabulary (continued)**Extra Practice**

In Exercises 1–9, solve the equation by graphing. Check your solution(s).

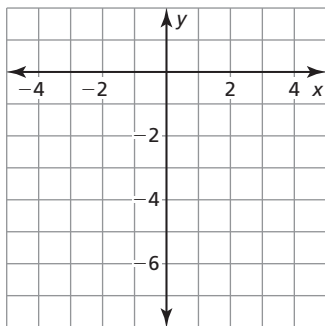
1. $2x - 7 = -2x + 9$



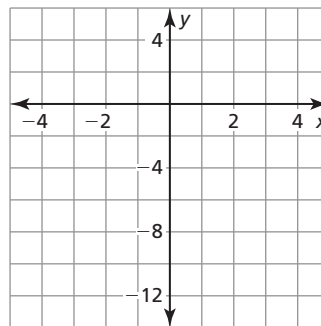
2. $3x = x - 4$



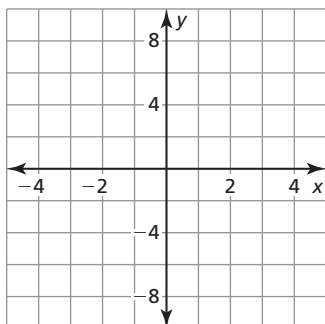
3. $4x + 1 = -2x - 5$



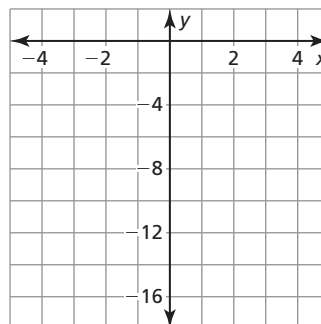
4. $-x - 4 = 3(x - 4)$



5. $-3x - 5 = 6 - 3x$

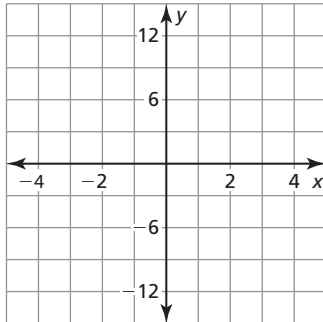
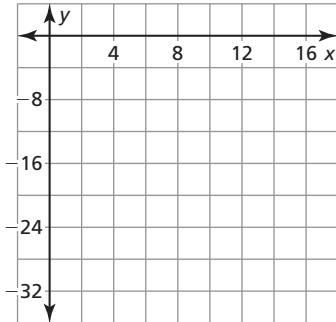


6. $7x - 14 = -7(2 - x)$

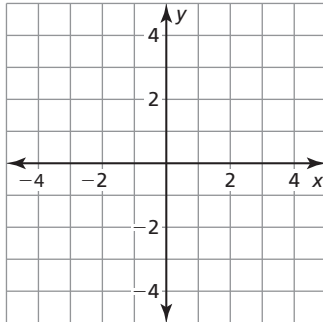
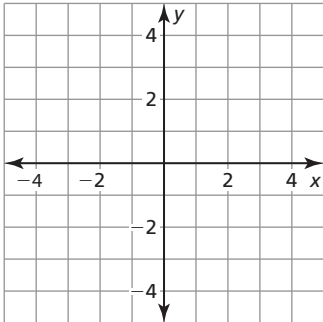


5.5 Notetaking with Vocabulary (continued)

7. $|3x| = |2x + 10|$



8. $|x - 1| = |x + 3|$



9. $|x + 4| = |2 - x|$

