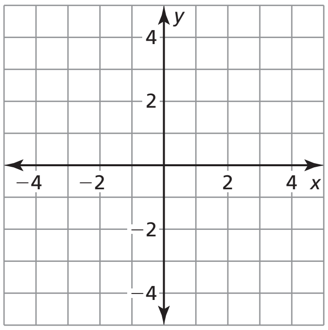
Name____ Date__________

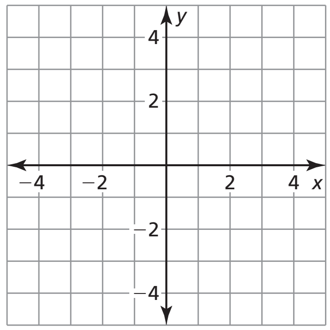
Chapter 5 Maintaining Mathematical Proficiency

Graph the equation.

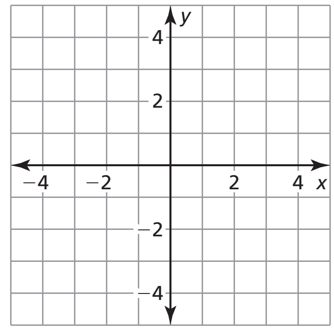
1. $y + 2 = x$



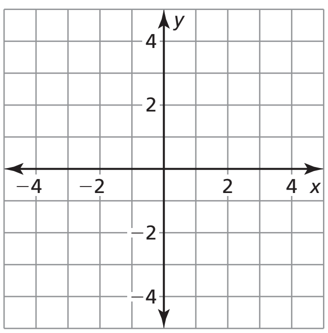
2. $2x - y = 3$



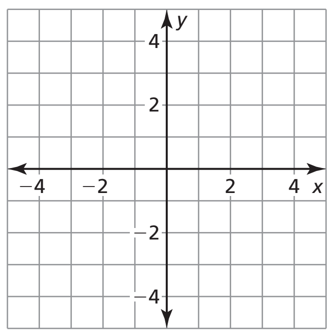
3. $5x + 2y = 10$



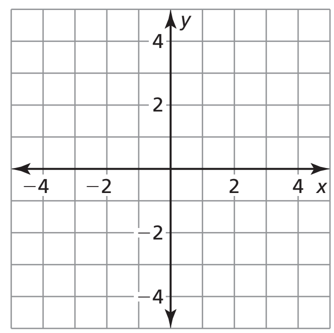
4. $y - 3 = x$



5. $3x - y = -2$



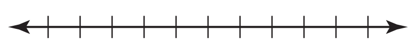
6. $3x + 4y = 12$



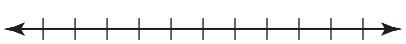
Solve the inequality. Graph the solution.

7. $a - 3 > -2$

8. $-4 \geq -2c$



9. $2d - 5 < -3$



10. $8 - 3r \leq 5 - 2r$

Name ____ Date __________

5.1 Solving Systems of Linear Equations by Graphing
For use with Exploration 5.1

Essential Question How can you solve a system of linear equations?

1 EXPLORATION: Writing a System of Linear Equations

Work with a partner. Your family opens a bed-and-breakfast. They spend $600 preparing a bedroom to rent. The cost to your family for food and utilities is $15 per night. They charge $75 per night to rent the bedroom.

a. Write an equation that represents the costs.

$$\underset{\text{(in dollars)}}{\text{Cost, } C} = \underset{\text{night}}{\text{\$15 per}} \bullet \underset{\text{nights, } x}{\text{Number of}} + \text{\$600}$$

b. Write an equation that represents the revenue (income).

$$\underset{\text{(in dollars)}}{\text{Revenue, } R} = \underset{\text{night}}{\text{\$75 per}} \bullet \underset{\text{nights, } x}{\text{Number of}}$$

c. A set of two (or more) linear equations is called a **system of linear equations.** Write the system of linear equations for this problem.

2 EXPLORATION: Using a Table or Graph to Solve a System

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

Work with a partner. Use the cost and revenue equations from Exploration 1 to determine how many nights your family needs to rent the bedroom before recovering the cost of preparing the bedroom. This is the *break-even point*.

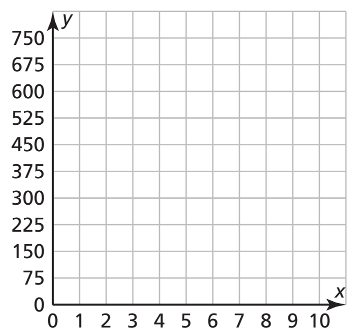
a. Complete the table.

***x* (nights)**	0	1	2	3	4	5	6	7	8	9	10	11
***C* (dollars)**												
***R* (dollars)**												

2 EXPLORATION: Using a Table or Graph to Solve a System (continued)

b. How many nights does your family need to rent the bedroom before breaking even?

c. In the same coordinate plane, graph the cost equation and the revenue equation from Exploration 1.



d. Find the point of intersection of the two graphs. What does this point represent? How does this compare to the break-even point in part (b)? Explain.

Communicate Your Answer

3. How can you solve a system of linear equations? How can you check your solution?

4. Solve each system by using a table or sketching a graph. Explain why you chose each method. Use a graphing calculator to check each solution.

a. $y = -4.3x - 1.3$
$y = 1.7x + 4.7$

b. $y = x$
$y = -3x + 8$

c. $y = -x - 1$
$y = 3x + 5$

Name ____ Date _________

5.1 Notetaking with Vocabulary

For use after Lesson 5.1

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

system of linear equations

solution of a system of linear equations

Core Concepts

Solving a System of Linear Equations by Graphing

Step 1 Graph each equation in the same coordinate plane.

Step 2 Estimate the point of intersection.

Step 3 Check the point from Step 2 by substituting for x and y in each equation of the original system.

Notes:

Extra Practice

In Exercises 1–6, tell whether the ordered pair is a solution of the system of linear equations.

1. $(3, 1);\ x + y = 4$
$2x - y = 3$

2. $(1, 3);\ x - y = -2$
$2x + y = 5$

3. $(2, 0);\ y = x - 2$
$y = -3x + 6$

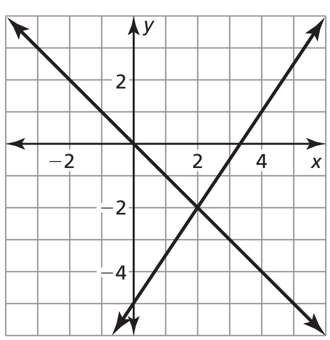
4. $(-1, -2);\ x - 2y = 3$
$2x - y = 0$

5. $(-2, 3);\ 3x - 2y = -12$
$2x + 4y = 9$

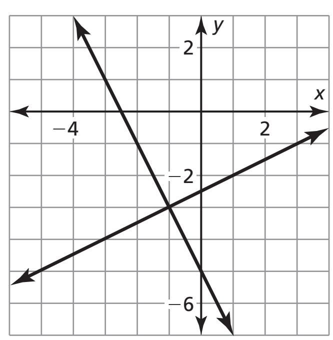
6. $(4, -3);\ 2x + 2y = 2$
$3x - 3y = 21$

In Exercises 7–9, use the graph to solve the system of linear equations. Check your solution.

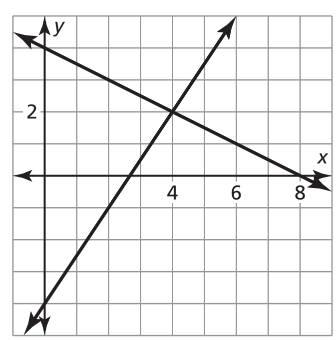
7. $3x - 2y = 10$
$x + y = 0$



8. $x - 2y = 5$
$2x + y = -5$



9. $x + 2y = 8$
$3x - 2y = 8$

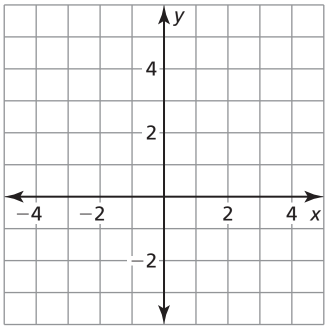


5.1 Notetaking with Vocabulary (continued)

In Exercises 10–15, solve the system of linear equations by graphing.

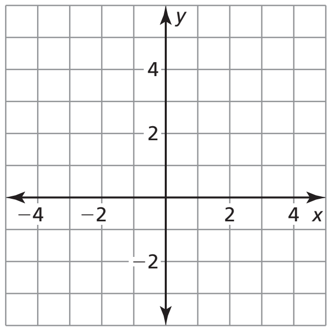
10. $y = -x + 3$

$y = x + 5$



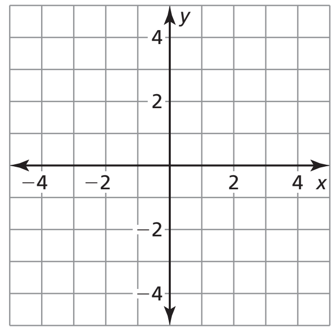
11. $y = \frac{1}{2}x + 2$

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



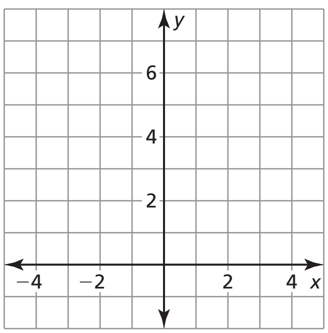
12. $3x - 2y = 6$

$y = -3$



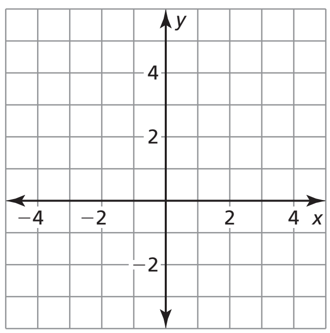
13. $y = 4x$

$y = -4x + 8$



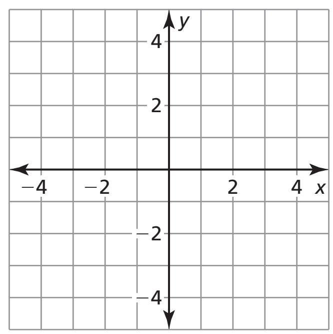
14. $y = \frac{1}{4}x + 3$

$y = \frac{3}{4}x + 5$

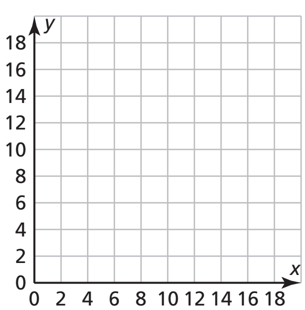


15. $3x - 4y = 7$

$5x + 2y = 3$



16. A test has twenty questions worth 100 points. The test consists of x true-false questions worth 4 points each and y multiple choice questions worth 8 points each. How many of each type of question are on the test?



Name____ Date__________

5.2 Solving Systems of Linear Equations by Substitution

For use with Exploration 5.2

Essential Question How can you use substitution to solve a system of linear equations?

1 EXPLORATION: Using Substitution to Solve Systems

Work with a partner. Solve each system of linear equations using two methods.

Method 1 **Solve for x first.**

Solve for x in one of the equations. Substitute the expression for x into the other equation to find y. Then substitute the value of y into one of the original equations to find x.

Method 2 **Solve for y first.**

Solve for y in one of the equations. Substitute the expression for y into the other equation to find x. Then substitute the value of x into one of the original equations to find y.

Is the solution the same using both methods? Explain which method you would prefer to use for each system.

a. $x + y = -7$
$-5x + y = 5$

b. $x - 6y = -11$
$3x + 2y = 7$

c. $4x + y = -1$
$3x - 5y = -18$

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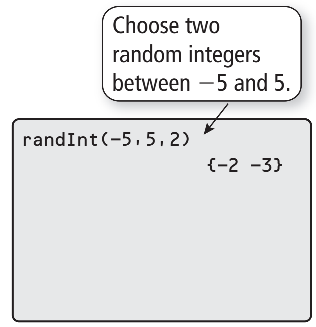
2 EXPLORATION: Writing and Solving a System of Equations

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

Work with a partner.

a. Write a random ordered pair with integer coordinates. One way to do this is to use a graphing calculator. The ordered pair generated at the right is $(-2, -3)$.



b. Write a system of linear equations that has your ordered pair as its solution.

c. Exchange systems with your partner and use one of the methods from Exploration 1 to solve the system. Explain your choice of method.

Communicate Your Answer

3. How can you use substitution to solve a system of linear equations?

4. Use one of the methods from Exploration 1 to solve each system of linear equations. Explain your choice of method. Check your solutions.

a. $x + 2y = -7$
$2x - y = -9$

b. $x - 2y = -6$
$2x + y = -2$

c. $-3x + 2y = -10$
$-2x + y = -6$

d. $3x + 2y = 13$
$x - 3y = -3$

e. $3x - 2y = 9$
$-x - 3y = 8$

f. $3x - y = -6$
$4x + 5y = 11$

Name____ Date __________

5.2 Notetaking with Vocabulary
For use after Lesson 5.2

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

system of linear equations

solution of a system of linear equations

Core Concepts

Solving a System of Linear Equations by Substitution

Step 1 Solve one of the equations for one of the variables.

Step 2 Substitute the expression from Step 1 into the other equation and solve for the other variable.

Step 3 Substitute the value from Step 2 into one of the original equations and solve.

Notes:

Extra Practice

In Exercises 1–18, solve the system of linear equations by substitution. Check your solution.

1. $2x + 2y = 10$
$y = 5 + x$

2. $2x - y = 3$
$x = -2y - 1$

3. $x - 3y = -1$
$x = y$

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

5. $2x + y = 3$
$x = 3y + 5$

6. $3x + y = -5$
$y = 2x + 5$

7. $y = 2x + 8$
$y = -2x$

8. $y = \frac{3}{4}x + 1$
$y = \frac{1}{4}x + 3$

9. $2x - 3y = 0$
$y = 4$

10. $x + y = 3$
$2x + 4y = 8$

11. $y = \frac{1}{2}x + 1$
$y = -\frac{1}{2}x + 9$

12. $3x - 2y = 3$
$4x - y = 4$

13. $7x - 4y = 8$
$5x - y = 2$

14. $y = \frac{3}{5}x - 12$
$y = \frac{1}{3}x - 8$

15. $3x - 4y = -1$
$5x + 2y = 7$

16. $y = -x + 3$
$x + 2y = 0$

17. $y - 5x = -2$
$-4x + y = 2$

18. $4x - 8y = 3$
$8x + 4y = 1$

19. An adult ticket to a museum costs \$3 more than a children's ticket. When 200 adult tickets and 100 children's tickets are sold, the total revenue is \$2100. What is the cost of a children's ticket?

Name ____ Date __________

5.3 Solving Systems of Linear Equations by Elimination

For use with Exploration 5.3

Essential Question How can you use elimination to solve a system of linear equations?

1 EXPLORATION: Writing and Solving a System of Equations

Work with a partner. You purchase a drink and a sandwich for \$4.50. Your friend purchases a drink and five sandwiches for \$16.50. You want to determine the price of a drink and the price of a sandwich.

a. Let x represent the price (in dollars) of one drink. Let y represent the price (in dollars) of one sandwich. Write a system of equations for the situation. Use the following verbal model.

Number of drinks	•	Price per drink	+	Number of sandwiches	•	Price per sandwich	=	Total price

Label one of the equations Equation 1 and the other equation Equation 2.

b. Subtract Equation 1 from Equation 2. Explain how you can use the result to solve the system of equations. Then find and interpret the solution.

2 EXPLORATION: Using Elimination to Solve Systems

Work with a partner. Solve each system of linear equations using two methods.

Method 1 **Subtract.** Subtract Equation 2 from Equation 1.Then use the result to solve the system.

Method 2 **Add.** Add the two equations. Then use the result to solve the system.

Is the solution the same using both methods? Which method do you prefer?

a. $3x - y = 6$
$3x + y = 0$

b. $2x + y = 6$
$2x - y = 2$

c. $x - 2y = -7$
$x + 2y = 5$

3 EXPLORATION: Using Elimination to Solve a System

Work with a partner.

$2x + y = 7$ Equation 1

$x + 5y = 17$ Equation 2

a. Can you eliminate a variable by adding or subtracting the equations as they are? If not, what do you need to do to one or both equations so that you can?

b. Solve the system individually. Then exchange solutions with your partner and compare and check the solutions.

Communicate Your Answer

4. How can you use elimination to solve a system of linear equations?

5. When can you add or subtract the equations in a system to solve the system? When do you have to multiply first? Justify your answers with examples.

6. In Exploration 3, why can you multiply an equation in the system by a constant and not change the solution of the system? Explain your reasoning.

Name ____ Date _________

5.3 Notetaking with Vocabulary

For use after Lesson 5.3

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

coefficient

Core Concepts

Solving a System of Linear Equations by Elimination

Step 1 Multiply, if necessary, one or both equations by a constant so at least one pair of like terms has the same or opposite coefficients.

Step 2 Add or subtract the equations to eliminate one of the variables.

Step 3 Solve the resulting equation.

Step 4 Substitute the value from Step 3 into one of the original equations and solve for the other variable.

Notes:

Extra Practice

In Exercises 1–18, solve the system of linear equations by elimination. Check your solution.

1. $x + 3y = 17$
$-x + 2y = 8$

2. $2x - y = 5$
$5x + y = 16$

3. $2x + 3y = 10$
$-2x - y = -2$

4. $4x + 3y = 6$
$-x - 3y = 3$

5. $5x + 2y = -28$
$-5x + 3y = 8$

6. $2x - 5y = 8$
$3x + 5y = -13$

7. $2x + y = 12$
$3x - 18 = y$

8. $4x + 3y = 14$
$2y = 6 + 4x$

9. $-4x = -2 + 4y$
$-4y = 1 - 4x$

5.3 Notetaking with Vocabulary (continued)

10. $x + 2y = 20$
$2x + y = 19$

11. $3x - 2y = -2$
$4x - 3y = -4$

12. $9x + 4y = 11$
$3x - 10y = -2$

13. $4x + 3y = 21$
$5x + 2y = 21$

14. $-3x - 5y = -7$
$-4x - 3y = -2$

15. $8x + 4y = 12$
$7x + 3y = 10$

16. $4x + 3y = -7$
$-2x - 5y = 7$

17. $8x - 3y = -9$
$5x + 4y = 12$

18. $-3x + 5y = -2$
$2x - 2y = 1$

19. The sum of two numbers is 22. The difference is 6. What are the two numbers?

Name____ Date__________

5.4 Solving Special Systems of Linear Equations

For use with Exploration 5.4

Essential Question Can a system of linear equations have no solution or infinitely many solutions?

1 EXPLORATION: Using a Table to Solve a System

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

Work with a partner. You invest \$450 for equipment to make skateboards. The materials for each skateboard cost \$20. You sell each skateboard for \$20.

a. Write the cost and revenue equations. Then complete the table for your cost C and your revenue R.

***x* (skateboards)**	0	1	2	3	4	5	6	7	8	9	10
***C* (dollars)**											
***R* (dollars)**											

b. When will your company break even? What is wrong?

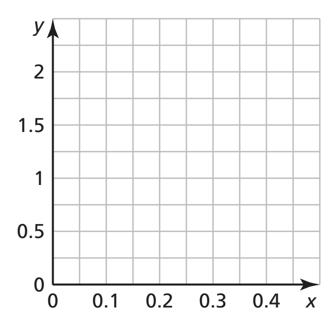
2 EXPLORATION: Writing and Analyzing a System

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

Work with a partner. A necklace and matching bracelet have two types of beads. The necklace has 40 small beads and 6 large beads and weighs 10 grams. The bracelet has 20 small beads and 3 large beads and weighs 5 grams. The threads holding the beads have no significant weight.

a. Write a system of linear equations that represents the situation. Let x be the weight (in grams) of a small bead and let y be the weight (in grams) of a large bead.

b. Graph the system in the coordinate plane shown. What do you notice about the two lines?



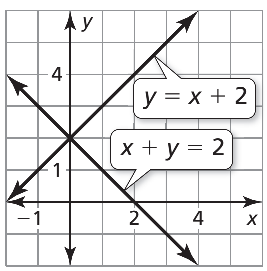
c. Can you find the weight of each type of bead? Explain your reasoning.

Communicate Your Answer

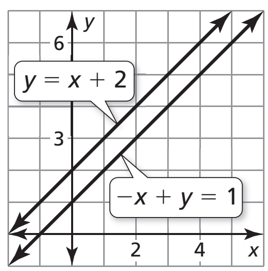
3. Can a system of linear equations have no solution or infinitely many solutions? Give examples to support your answers.

4. Does the system of linear equations represented by each graph have *no solution*, *one solution*, or *infinitely many solutions*? Explain.

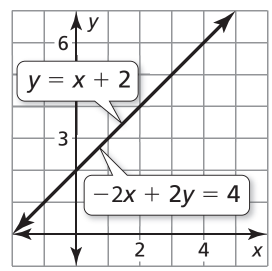
a.



b.



c.



Name____ Date__________

5.4 Notetaking with Vocabulary
For use after Lesson 5.4

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

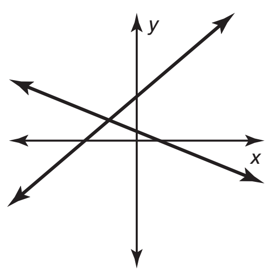
parallel

Core Concepts

Solutions of Systems of Linear Equations

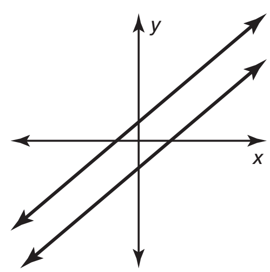
A system of linear equations can have *one solution*, *no solution*, or *infinitely many solutions*.

One solution



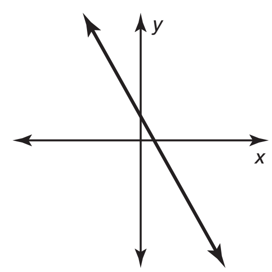
The lines intersect.

No solution



The lines are parallel.

Infinitely many solutions



The lines are the same.

Notes:

5.4 Notetaking with Vocabulary (continued)

Extra Practice

In Exercises 1–18, solve the system of linear equations.

1. $y = 3x - 7$
$y = 3x + 4$

2. $y = 5x - 1$
$y = -5x + 5$

3. $2x - 3y = 10$
$-2x + 3y = -10$

4. $x + 3y = 6$
$-x - 3y = 3$

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

6. $2x - 5y = -3$
$3x + 5y = 8$

7. $2x + 3y = 1$
$-2x + 3y = -7$

8. $4x + 3y = 17$
$-8x - 6y = 34$

9. $3x - 2y = 6$
$-9x + 6y = -18$

Name______________________________ Date__________

5.4 Notetaking with Vocabulary (continued)

10. $-2x + 5y = -21$
$2x - 5y = 21$

11. $3x - 8y = 3$
$8x - 3y = 8$

12. $18x + 12y = 24$
$3x + 2y = 6$

13. $15x - 6y = 9$
$5x - 2y = 27$

14. $-3x - 5y = 8$
$6x + 10y = -16$

15. $2x - 4y = 2$
$-2x - 4y = 6$

16. $5x + 7y = 7$
$7x + 5y = 5$

17. $y = \frac{2}{3}x + 7$
$y = \frac{2}{3}x - 5$

18. $-3x + 5y = 15$
$9x - 15y = -45$

19. You have \$15 in savings. Your friend has \$25 in savings. You both start saving \$5 per week. Write a system of linear equations that represents this situation. Will you ever have the same amount of savings as your friend? Explain.

Name ____ Date _________

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

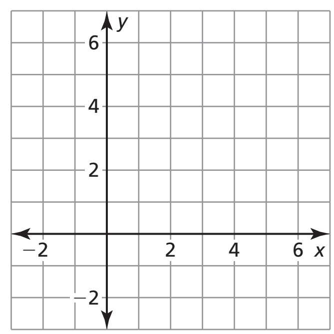
Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

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

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

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

4. 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.

Name ____ Date __________

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.

$$ax + b = cx + d$$

$\boxed{y = ax + b}$ and $\boxed{y = cx + d}$

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 $ax + b = cx + d$.

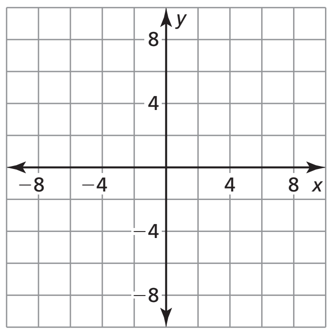
Notes:

5.5 Notetaking with Vocabulary (continued)

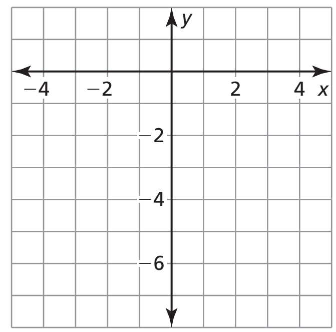
Extra Practice

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

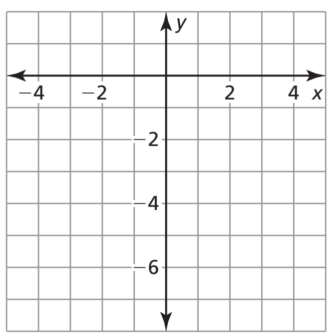
1. $2x - 7 = -2x + 9$



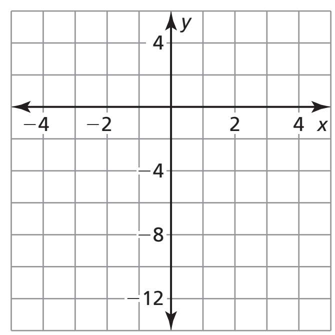
2. $3x = x - 4$



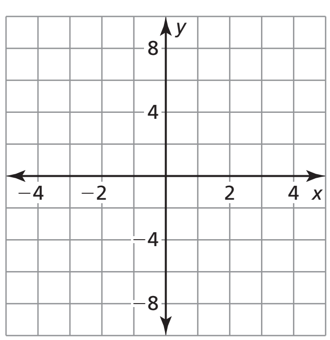
3. $4x + 1 = -2x - 5$



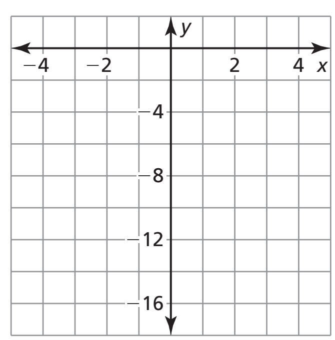
4. $-x - 4 = 3(x - 4)$



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



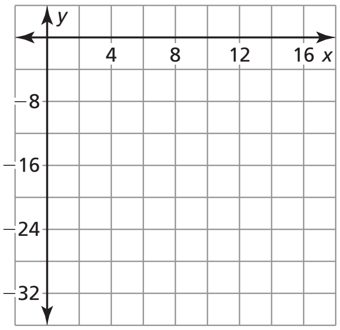
6. $7x - 14 = -7(2 - x)$

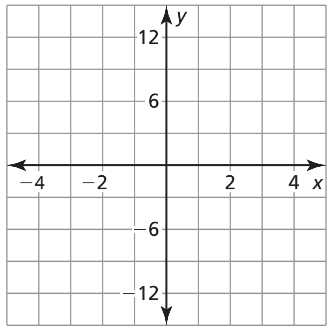


Name ____ Date _________

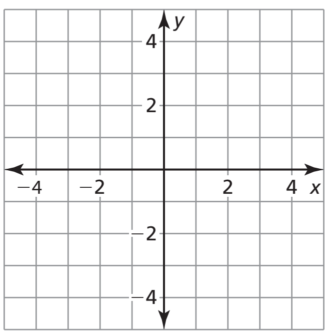
5.5 Notetaking with Vocabulary (continued)

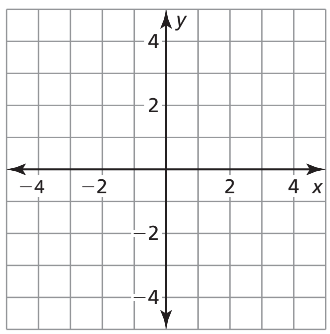
7. $|3x| = |2x + 10|$



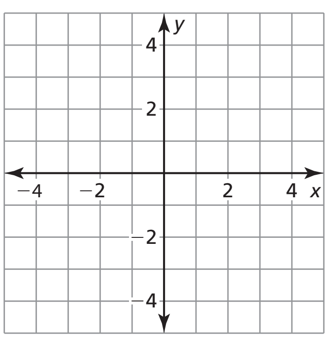


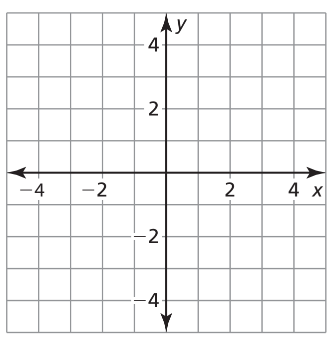
8. $|x - 1| = |x + 3|$





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





Name______________________________ Date__________

5.6 Graphing Linear Inequalities in Two Variables

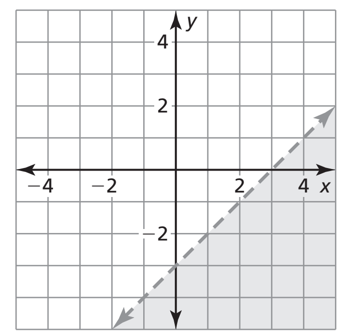
For use with Exploration 5.6

Essential Question How can you graph a linear inequality in two variables?

A **solution of a linear inequality in two variables** is an ordered pair (x, y) that makes the inequality true. The **graph of a linear inequality** in two variables shows all the solutions of the inequality in a coordinate plane.

1 EXPLORATION: Writing a Linear Inequality in Two Variables

Work with a partner.



a. Write an equation represented by the dashed line.

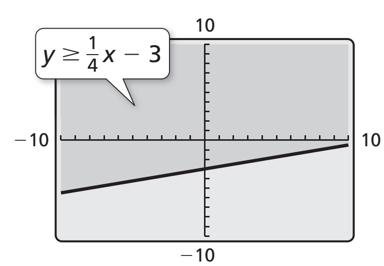
b. The solutions of an inequality are represented by the shaded region. In words, describe the solutions of the inequality.

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

2 EXPLORATION: Using a Graphing Calculator

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

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.

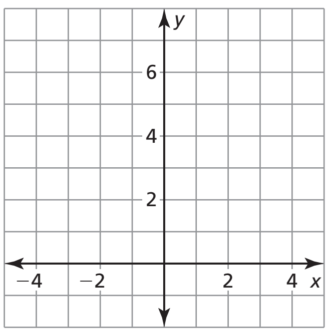
Because the inequality symbol is *greater than or equal to*, the line is solid and not dashed. Some graphing calculators always use a solid line when graphing inequalities. In this case, you have to determine whether the line should be solid or dashed, based on the inequality symbol used in the original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

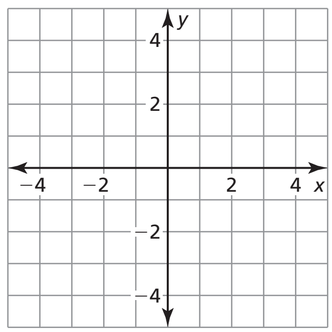
3 EXPLORATION: Graphing Linear Inequalities in Two Variables

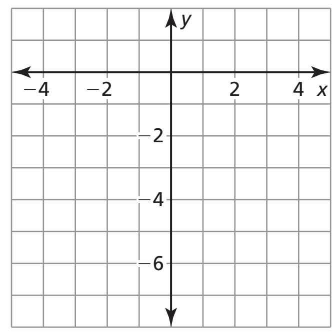
Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

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.** $y \geq -x - 5$







Communicate Your Answer

4. How can you graph a linear inequality in two variables?

5. Give an example of a real-life situation that can be modeled using a linear inequality in two variables.

Name____ Date __________

5.6 Notetaking with Vocabulary

For use after Lesson 5.6

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

linear inequality in two variables

solution of a linear inequality in two variables

graph of a linear inequality

half-planes

Core Concepts

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 a 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.

Notes:

Name ____ Date __________

Extra Practice

In Exercises 1–6, tell whether the ordered pair is a solution of the inequality.

1. $x + y > 5; (3, 2)$

2. $x - y \geq 2; (5, 3)$

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

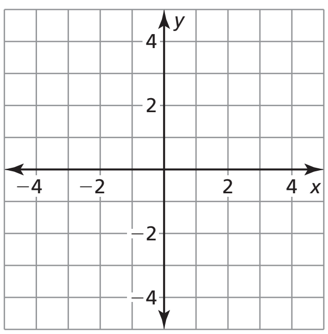
4. $5x + y < 7; (2, -2)$

5. $3x - 4y > 6; (-1, -1)$

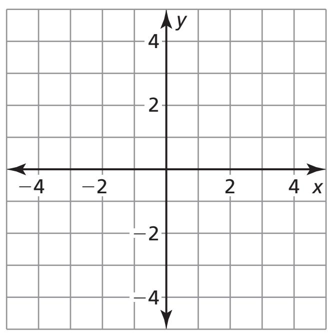
6. $-x - 2y \geq 5; (-2, -3)$

In Exercises 7–18, graph the inequality in a coordinate plane.

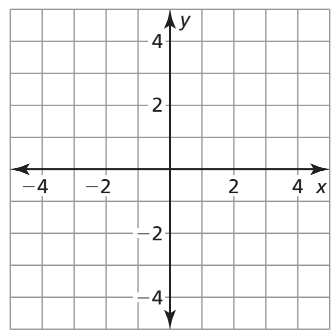
7. $y < 4$



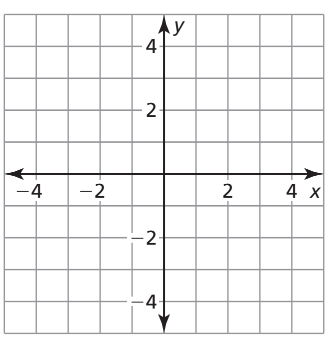
8. $y > -1$



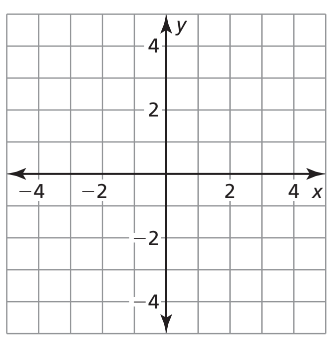
9. $x > 3$



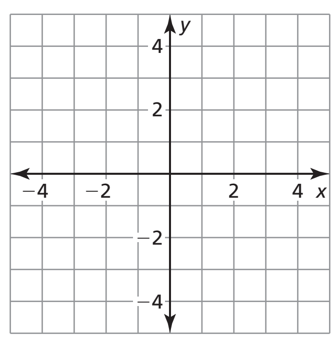
10. $x \leq -1$



11. $y < -2$



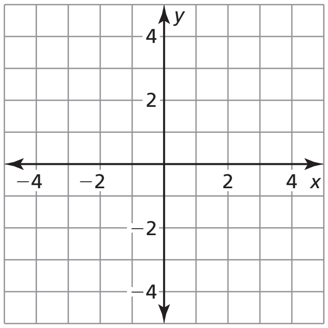
12. $x > -2$



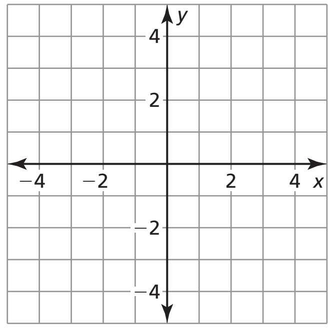
Name____ Date__________

5.6 Notetaking with Vocabulary (continued)

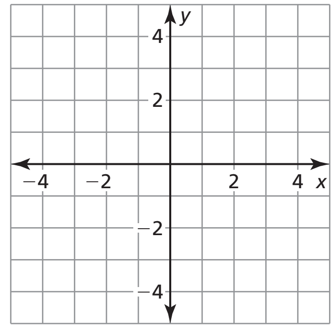
13. $y < 3x + 1$



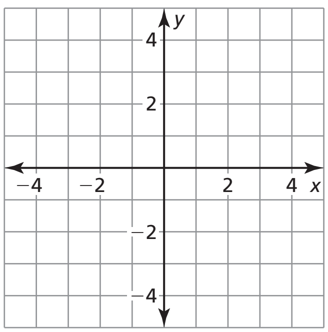
14. $y \geq -x + 1$



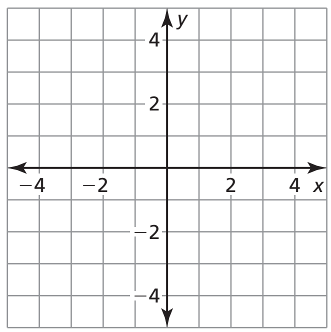
15. $x - y < 2$



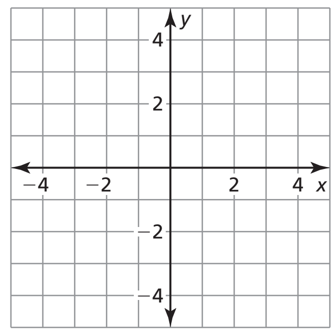
16. $x + y \geq -3$



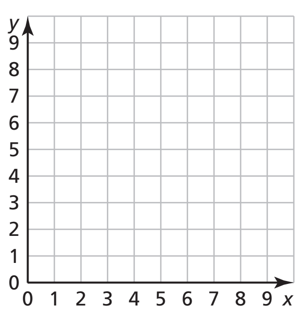
17. $x + 2y < 4$



18. $-2x + 3y > 6$



19. An online store sells digital cameras and cell phones. The store makes a \$100 profit on the sale of each digital camera x and a \$50 profit on the sale of each cell phone y. The store wants to make a profit of at least \$300 from its sales of digital cameras and cell phones. Write and graph an inequality that represents how many digital cameras and cell phones they must sell. Identify and interpret two solutions of the inequality.



Name ______________________________ Date __________

5.7 Systems of Linear Inequalities

For use with Exploration 5.7

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

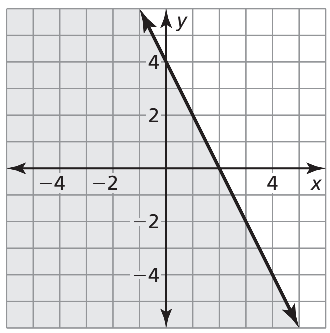
1 EXPLORATION: Graphing Linear Inequalities

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

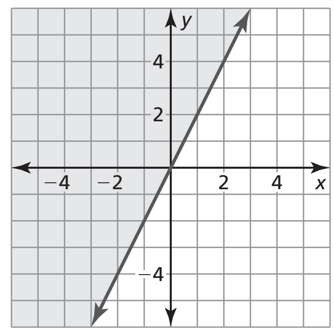
$2x + y \leq 4$ Inequality 1

$2x - y \leq 0$ Inequality 2

A.



B.



2 EXPLORATION: Graphing a System of Linear Inequalities

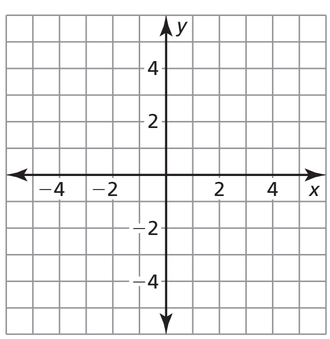
Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

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?



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?

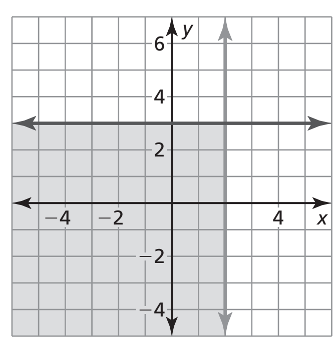
Communicate Your Answer

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.



Name ____ Date __________

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

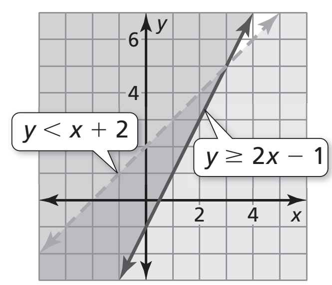
graph of a system of linear inequalities

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

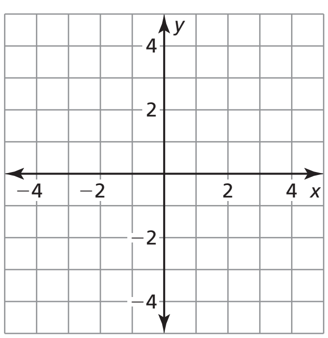
2. $(-1, 1)$; $y < 3$
$y > x - 4$

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

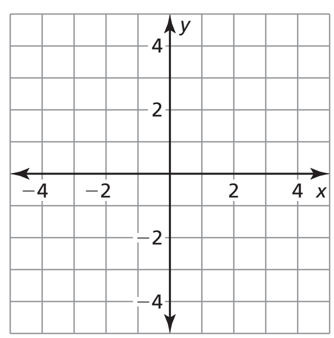
4. $(0, 4)$; $y \leq -x + 4$
$y \geq 5x - 3$

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

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



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

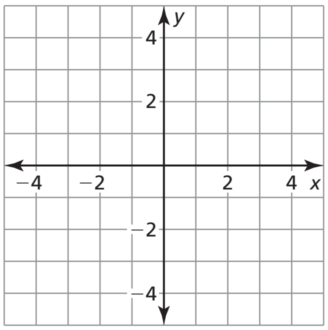


Name ______________________________ Date __________

5.7 Notetaking with Vocabulary (continued)

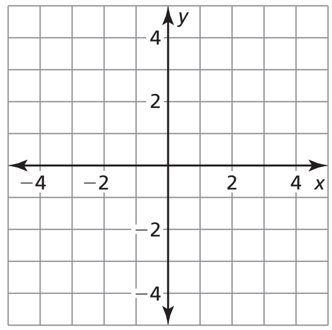
7. $y \geq x - 2$

$y < -x + 2$



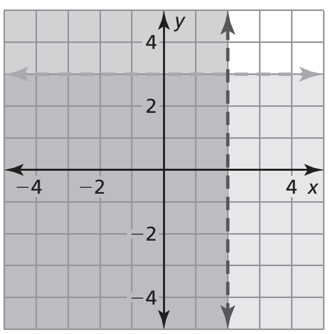
8. $2x + 3y < 6$

$y - 1 \geq -2x$



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

9.



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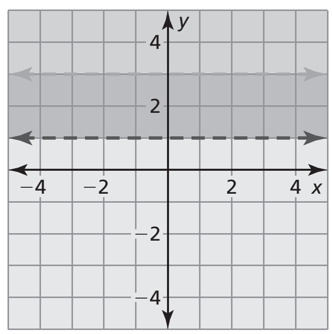

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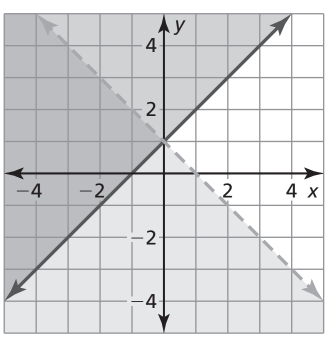

12.