Name_____ Date _____

Chapter 5 Fair Game Review

Simplify the expression.

1. $2x + 5 - x$

2. $4 + 2d - 4d$

3. $7y - 8 + 6y - 3$

4. $5 + 4z - 3 + 3z$

5. $4(s + 2) + s - 1$

6. $2(4x - 5) - 3$

7. The width of a garden is $(4x - 1)$ feet and the length is $2x$ feet. Find the perimeter of the garden.

Name _____ Date _____

Chapter 5 Fair Game Review (continued)

Solve the equation. Check your solution.

8. $8y - 3 = 13$

9. $4a + 11 - a = 2$

10. $9 = 4(3k - 4) - 7k$

11. $-12 - 5(6 - 2m) = 18$

12. $15 - t + 8t = -13$

13. $5h - 2\left(\frac{3}{2}h + 4\right) = 10$

14. The profit P (in dollars) from selling x calculators is $P = 25x - (10x + 250)$. How many calculators are sold when the profit is \$425?

Name_____ Date _____

5.1 Solving Systems of Linear Equations by Graphing

For use with Activity 5.1

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

1 ACTIVITY: Writing a System of Linear Equations

Work with a partner.

Your family starts a bed-and-breakfast. It spends $500 fixing up a bedroom to rent. The cost for food and utilities is $10 per night. Your family charges $60 per night to rent the bedroom.

a. Write an equation that represents the costs.

Cost, C (in dollars)	=	$10 per night	•	Number of nights, x	+	$500

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

Revenue, R (in dollars)	=	$60 per night	•	Number of nights, x

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.

Name _____ Date _____

5.1 Solving Systems of Linear Equations by Graphing (continued)

2 ACTIVITY: Using a Table to Solve a System

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

a. Complete the table.

x	0	1	2	3	4	5	6	7	8	9	10	11
C												
R												

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

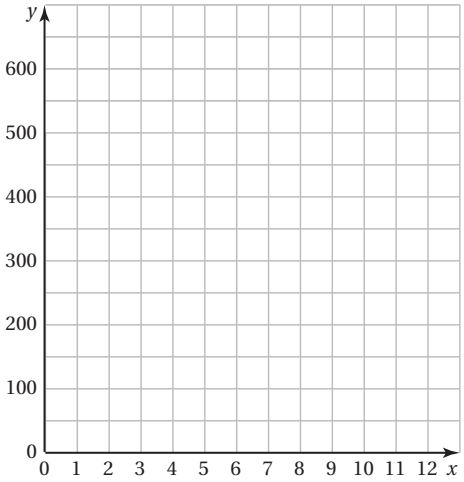
3 ACTIVITY: Using a Graph to Solve a System

Work with a partner.

a. Graph the cost equation from Activity 1.

b. In the same coordinate plane, graph the revenue equation from Activity 1.

c. Find the point of intersection of the two graphs. What does this point represent? How does this compare to the break-even point in Activity 2? Explain.



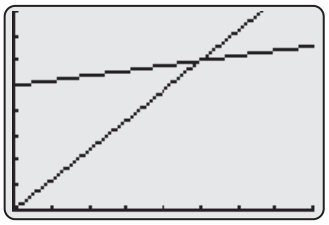
5.1 Solving Systems of Linear Equations by Graphing (continued)

4 ACTIVITY: Using a Graphing Calculator

Work with a partner. Use a graphing calculator to solve the system.

$y = 10x + 500$ **Equation 1**

$y = 60x$ **Equation 2**



a. Enter the equations into your calculator. Then graph the equations. What is an appropriate window?

b. On your graph, how can you determine which line is the graph of which equation? Label the equations on the graph shown.

c. Visually estimate the point of intersection of the graphs.

d. To find the solution, use the *intersect* feature to find the point of intersection. The solution is at (____, ____).

What Is Your Answer?

5. IN YOUR OWN WORDS How can you solve a system of linear equations? How can you check your solution?

6. CHOOSE TOOLS Solve one of the systems by using a table, another system by sketching a graph, and the remaining system by using a graphing calculator. Explain why you chose each method.

a. $y = 4.3x + 1.2$
$y = -1.7x - 2.4$

b. $y = x$
$y = -2x + 9$

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

Name _____ Date _____

5.1 Practice

For use after Lesson 5.1

1. Use the table to find the break-even point. Check your solution.

$C = 25x + 210$

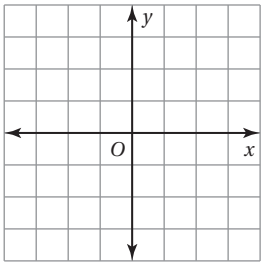
$R = 60x$

x	0	1	2	3	4	5	6	7	8
C									
R									

Solve the system of linear equations by graphing.

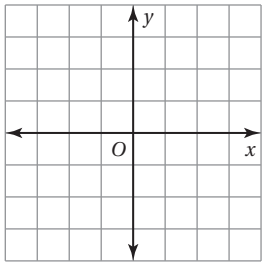
2. $y = 3x + 1$

$y = -2x - 4$



3. $y = -4x + 1$

$y = 5x - 8$



Use a graphing calculator to solve the system of linear equations.

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

$x - y = 4$

5. $y = x - 7$

$y + x = 3$

6. There are 26 students in your class. There are 4 more girls than boys. Use a system of linear equations to find how many boys are in your class. How many girls are in your class?

Name_____ Date _____

5.2 Solving Systems of Linear Equations by Substitution

For use with Activity 5.2

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

1 ACTIVITY: Using Substitution to Solve a System

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. Use the expression for x to find the solution of the system. Explain how you did it.

Method 2: Solve for y first.

Solve for y in one of the equations. Use the expression for y to find the solution of the system. Explain how you did it.

Is the solution the same using both methods?

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

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

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

d. $5x - y = 2$
$3x - 6y = 12$

e. $x + y = -1$
$5x + y = -13$

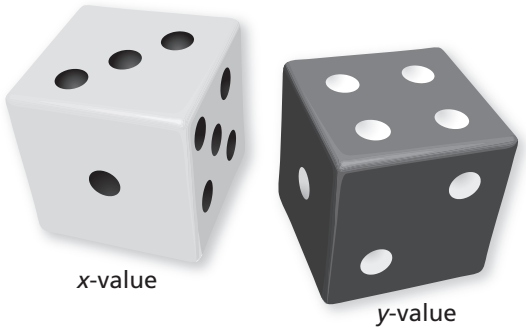
f. $2x - 6y = -6$
$7x - 8y = 5$

5.2 Solving Systems of Linear Equations by Substitution (continued)

2 ACTIVITY: Writing and Solving a System of Equations

Work with a partner.

a. Roll a pair of number cubes that have different colors. Then write the ordered pair shown by the number cubes. The ordered pair at the right is (3, 4).



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

c. Exchange systems with your partner and use one of the methods from Activity 1 to solve the system.

3 ACTIVITY: Solving a Secret Code

Work with a partner. Decode the quote by Archimedes.

___	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___	,
−8	−7	7	−5	−4	−5	−3	−2	−1	−3	0	−5	1	2	3	1	−3	4	5	

___	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___	.
−3	4	5	−7	6	−7	−1	−1	−4	2	7	−5	1	8	−5	−5	−3	9	1	8

5.2 Solving Systems of Linear Equations by Substitution (continued)

(A, C)
$$x + y = -3$$
$$x - y = -3$$

(D, E)
$$x + y = 0$$
$$x - y = 10$$

(G, H)
$$x + y = 0$$
$$x - y = -16$$

(I, L)
$$x + 2y = -9$$
$$2x - y = -13$$

(M, N)
$$x + 2y = 4$$
$$2x - y = -12$$

(O, P)
$$x + 2y = -2$$
$$2x - y = 6$$

(R, S)
$$2x + y = 21$$
$$x - y = 6$$

(T, U)
$$2x + y = -7$$
$$x - y = 10$$

(V, W)
$$2x + y = 20$$
$$x - y = 1$$

What Is Your Answer?

4. **IN YOUR OWN WORDS** How can you use substitution to solve a system of linear equations?

Name _____ Date _____

5.2 Practice

For use after Lesson 5.2

Solve the system of linear equations by substitution. Check your solution.

1. $y = -2x + 4$

$-x + 3y = -9$

2. $\frac{3}{4}x - 5y = 7$

$x = -4y + 12$

3. $5x - y = 4$

$2x + 2y = 16$

4. $2x + 3y = 0$

$8x + 9y = 18$

5. A gas station sells a total of 4500 gallons of regular gas and premium gas in one day. The ratio of gallons of regular gas sold to gallons of premium gas sold is 7 : 2.

a. Write a system of linear equations that represents this situation.

b. How many gallons sold were regular gas? premium gas?

Name_____ Date _____

5.3 Solving Systems of Linear Equations by Elimination

For use with Activity 5.3

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

1 ACTIVITY: Using Elimination to Solve a System

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

Method 1: Subtract.

Subtract Equation 2 from Equation 1. What is the result? Explain how you can use the result to solve the system of equations.

Method 2: Add.

Add the two equations. What is the result? Explain how you can use the result to solve the system of equations.

Is the solution the same using both methods?

a. $2x + y = 4$
$2x - y = 0$

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

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

2 ACTIVITY: Using Elimination to Solve a System

Work with a partner.

$2x + y = 2$ Equation 1

$x + 5y = 1$ Equation 2

a. Can you add or subtract the equations to solve the system of linear equations? Explain.

Name _____ Date _____

5.3 Solving Systems of Linear Equations by Elimination (continued)

b. Explain what property you can apply to Equation 1 in the system so that the y coefficients are the same.

c. Explain what property you can apply to Equation 2 in the system so that the x coefficients are the same.

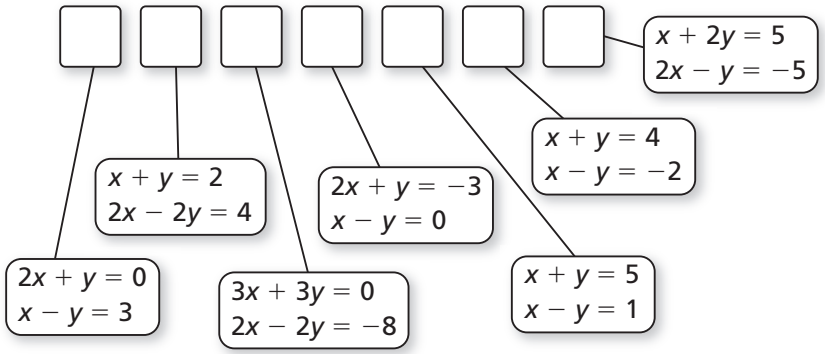
d. You solve the system in part (b). Your partner solves the system in part (c). Compare your solutions.

e. Use a graphing calculator to check your solution.

3 ACTIVITY: Solving a Secret Code

Work with a partner. Solve the puzzle to find the name of a famous mathematician who lived in Egypt around 350 A.D.

4	B	W	R	M	F	Y	K	N
3	O	J	A	S	I	D	X	Z
2	Q	P	C	E	G	B	T	J
1	M	R	C	Z	N	O	U	W
0	K	X	U	H	L	Y	S	Q
−1	F	E	A	S	W	K	R	M
−2	G	J	Z	N	H	V	D	G
−3	E	L	X	L	F	Q	O	B
	−3	−2	−1	0	1	2	3	4



5.3 Solving Systems of Linear Equations by Elimination (continued)

What Is Your Answer?

4. **IN YOUR OWN WORDS** How can you use elimination to solve a system of linear equations?

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

6. **LOGIC** In Activity 2, why can you multiply the equations in the system by a constant and not change the solution of the system? Explain your reasoning.

Name _____ Date _____

5.3 Practice

For use after Lesson 5.3

Solve the system of linear equations by elimination. Check your solution.

1. $x + y = 7$

$3x - y = 1$

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

$-2x + y = 16$

3. $8x - 9y = 7$

$2x - 3y = -5$

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

$9x - 4y = 1$

5. A high school has a total of 850 students. There are 60 more female students than there are male students.

a. Write a system of linear equations that represents this situation.

b. How many students are female? male?

Name_____ Date _____

5.4 Solving Special Systems of Linear Equations

For use with Activity 5.4

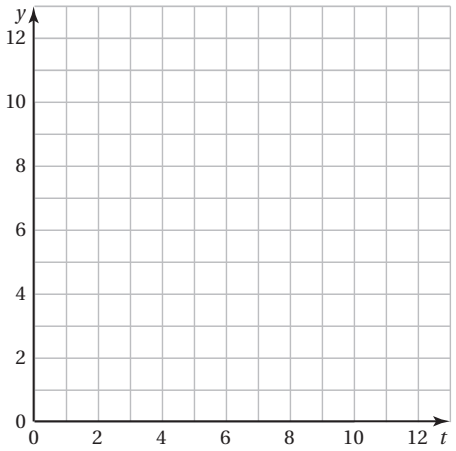
Essential Question Can a system of linear equations have no solution? Can a system of linear equations have many solutions?

1 ACTIVITY: Writing a System of Linear Equations

Work with a partner. Your cousin is 3 years older than you. Your ages can be represented by two linear equations.

$y = t$ Your age

$y = t + 3$ Your cousin's age



a. Graph both equations in the same coordinate plane.

b. What is the vertical distance between the two graphs? What does this distance represent?

c. Do the two graphs intersect? Explain what this means in terms of your age and your cousin's age.

2 ACTIVITY: Using a Table to Solve a System

Work with a partner. You invest $500 for equipment to make dog backpacks. Each backpack costs you $15 for materials. You sell each backpack for $15.

a. Complete the table for your cost C and your revenue R.

x	0	1	2	3	4	5	6	7	8	9	10
C											
R											

Name _____ Date _____

5.4 Solving Special Systems of Linear Equations (continued)

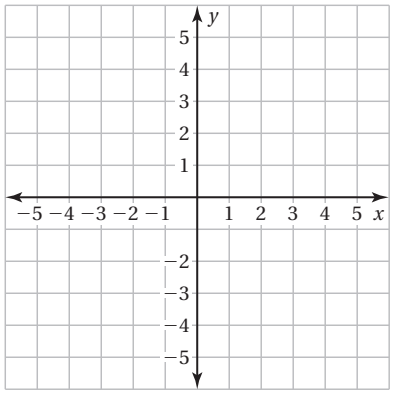
b. When will you break even? What is wrong?

3 ACTIVITY: Using a Graph to Solve a Puzzle

Work with a partner. Let x and y be two numbers. Here are two clues about the values of x and y.

	Words	Equation
Clue 1:	The value of y is 4 more than twice the value of x.	$y = 2x + 4$
Clue 2:	The difference of $3y$ and $6x$ is 12.	$3y - 6x = 12$

a. Graph both equations in the same coordinate plane.



b. Do the two lines intersect? Explain.

c. What is the solution of the puzzle?

d. Use the equation $y = 2x + 4$ to complete the table.

x	0	1	2	3	4	5	6	7	8	9	10
y											

5.4 Solving Special Systems of Linear Equations (continued)

e. Does each solution in the table satisfy *both* clues?

f. What can you conclude? How many solutions does the puzzle have? How can you describe them?

What Is Your Answer?

4. IN YOUR OWN WORDS Can a system of linear equations have no solution? Can a system of linear equations have many solutions? Give examples to support your answers.

Name _____ Date _____

5.4 Practice

For use after Lesson 5.4

Solve the system of linear equations. Check your solution.

1. $y = 2x - 5$

$y = 2x + 7$

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

$y = -\frac{3}{4}x - \frac{5}{2}$

3. $x - y = 8$

$2y = 2x - 16$

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

$2x + y = 9$

5. You start reading a book for your literature class two days before your friend. You both read 10 pages per night. A system of linear equations that represents this situation is $y = 10x + 20$ and $y = 10x$. Will your friend finish the book before you? Justify your answer.

Name_____ Date _____

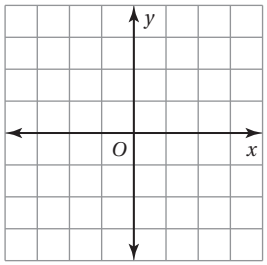
Extension 5.4

Practice

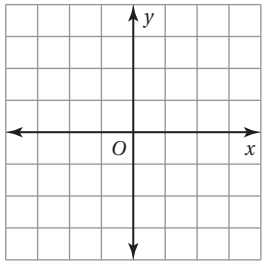
For use after Extension 5.4

Use a graph to solve the equation. Check your solution.

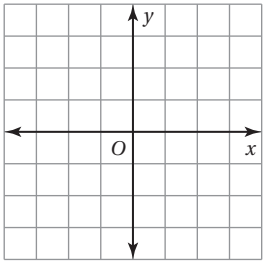
1. $3x - 4 = -x$



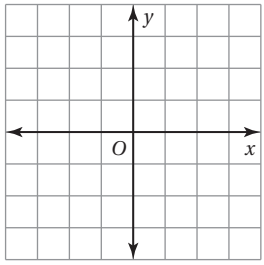
2. $\frac{1}{3}x + 3 = 4x - 8$



3. $\frac{1}{2}x + 4 = -x - 11$



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

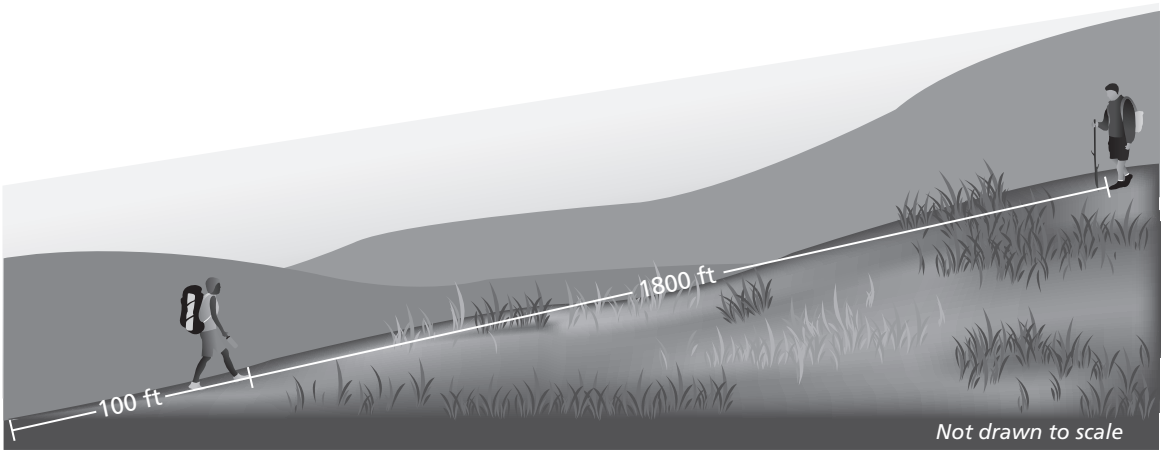


5. On the first day of your garage sale, you earned $12x + 9$ dollars. The next day you earned $22x$ dollars. Is it possible that you earned the same amount each day? Explain.

Name _____ Date _____

Extension 5.4 **Practice (continued)**

6. You hike uphill at a rate of 200 feet per minute. Your friend hikes downhill on the same trail at a rate of 250 feet per minute. How long will it be until you meet?



7. Two savings accounts earn simple interest. Account A has a beginning balance of \$500 and grows by \$25 per year. Account B has a beginning balance of \$750 and grows by \$15 per year.

Growth rate	•	Years, x	+	Beginning balance	=	Growth rate	•	Years, x	+	Beginning balance

a. Use the model to write an equation.

b. After how many years x do the accounts have the same balance?