5.5 Start Thinking

One of the most common uses for solving systems of equations is in business. When the amount of money spent on expenses equals the amount of money gained in revenue, it is called "breaking even."

Suppose you are in charge of a company that rents moving vans to customers. Each van costs $18,000, and you spend an average of $35 per rental day on maintenance costs. You rent the van for $59.99 per day. How could you set up a system of equations to find where your company "breaks even?" On average, how many days must one van be rented before the company makes any profit?

5.5 Warm Up

Graph the equation in a coordinate plane.

1. $y = 4x$

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

3. $x + y = 5$

4. $y = 3$

5. $2x + 5y = 11$

6. $y = -2x - 2$

5.5 Cumulative Review Warm Up

Write the next three terms of the arithmetic sequence.

1. First term: 3

Common difference: 12

2. First term: 19

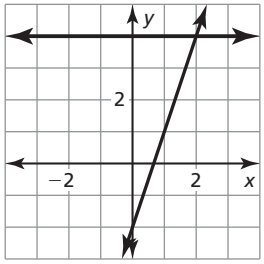
Common difference: -7

Name _____ Date _____

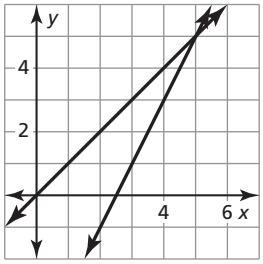
5.5 Practice A

In Exercises 1 and 2, use the graph to solve the equation. Check your solution.

1. $3x - 2 = 4$



2. $x = 2x - 5$



In Exercises 3–6, solve the equation by graphing. Check your solution.

3. $x - 6 = 3x$

4. $-x = x - 4$

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

6. $\frac{1}{3}x + 1 = x - 3$

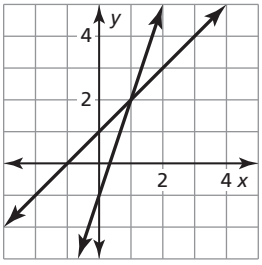
In Exercises 7 and 8, solve the equation by graphing. Determine whether the equation has *one solution*, *no solution,* or *infinitely many solutions.*

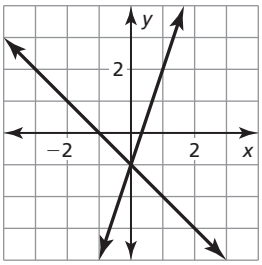
7. $4x + 3 = 4x - 2$

8. $3x + 6 = 3(x + 2)$

9. Use the graphs to solve the equation. Check your solutions.

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





In Exercises 10 and 11, solve the equation by graphing. Check your solutions.

10. $|x + 6| = |-2x|$

11. $|x + 1| = |2x - 4|$

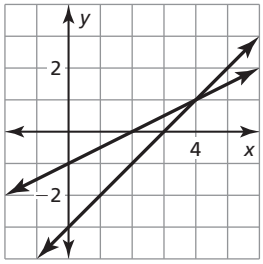
12. You need to rent a bowling lane. On Friday nights, you have two options. Option A is a $20 lane rental plus $3 per game. Option B is a $35 lane rental with a maximum of 10 games. For what number of games is the total cost the same for each option?

Name_____ Date _____

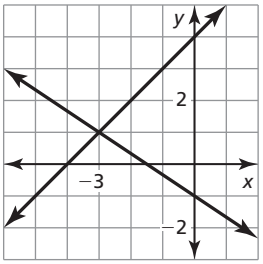
5.5 Practice B

In Exercises 1 and 2, use the graph to solve the equation. Check your solution.

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



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



In Exercises 3–6, solve the equation by graphing. Check your solution.

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

4. $\frac{1}{4}x - 6 = -2x + 3$

5. $3x + 6 = 3(x + 2)$

6. $-5(x + 2) = 4x - 1$

In Exercises 7 and 8, solve the equation by graphing. Determine whether the equation has *one solution*, *no solution,* or *infinitely many solutions.*

7. $-2(-x - 1) = 2x + 2$

8. $\frac{1}{4}(12x - 10) = 3x + 2$

In Exercises 9 and 10, solve the equation by graphing. Check your solutions.

9. $|x + 2| = |5 - x|$

10. $3|x - 1| = |2x + 8|$

In Exercises 11 and 12, use a graphing calculator to solve the equation.

11. $0.6x - 1.1 = 0.5x - 0.4$

12. $1.3x + 0.8 = 2.5x - 0.4$

13. Determine one set of values of a and b of the equation $2x - 3 = ax + b$ in each situation.

a. The equation has no solution.

b. The equation has infinitely many solutions.

c. $x = 4$ is a solution.

14. You need to hire a taxi. Taxi A charges \$9.25 plus \$1.50 per mile. Taxi B charges \$10.50 plus \$1.25 per mile. Use a graphing calculator to find the number of miles for which the total costs are the same for each taxi.

Name _____ Date _____

5.5 Enrichment and Extension

Extending Solving Equations by Graphing

In Exercises 1–6, graph and solve the equation by making a system of equations. Then prove that the system works algebraically. Check your solution.

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

2. $|x| = x + 4$

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

4. $|x| = x$

5. $|x| = -x$

6. $x^2 = 3x$

Name_____ Date _____

5.5 Puzzle Time

Why Don't Centipedes Play Soccer?

A	B	C	D	E	F
G	H	I	J	K	L

Complete each exercise. Find the answer in the answer column. Write the word under the answer in the box containing the exercise letter.

Solve the equation by graphing. Check your solution.

A. $2x = -x - 6$

B. $4x - 5 = 4x + 1$

C. $3x + 7 = -13 - 2x$

D. $\frac{1}{2}x - 9 = 13 - 5x$

E. $-2(6 - x) = 2x - 12$

F. $-\frac{1}{5}(5x - 10) = x + 14$

G. $|x| = |x - 1|$

H. $|x - 12| = |2x|$

I. $|4x| = |x + 15|$

J. $|3x - 8| = |x|$

K. $|x - 3| = |2x - 3|$

L. $|x - 6| = 3|x|$

infinitely many solutions GET	−4 TIME
2, 4 GAME	$\frac{1}{2}$ SHOES
7 WIN	6 NET
0, 2 HAS	−3, $\frac{3}{2}$ ENDED
no solution THE	−3, 5 THE
−12, 4 ON	4 THEY
$\frac{1}{4}$ LEGS	1 BALL
$\frac{1}{9}$ GOAL	−2 BY
−6 THEIR	11 SOCKS