5.3 Start Thinking

Consider the system of linear equations:

$3x - 2y = 7$

$5x - 2y = 13$

Are the coefficients of either the x-values or the y-values the same? If so, what are they? Subtract the second equation from the first equation to eliminate the like terms. What is the resulting equation? Why is this method of solving systems of linear equations useful? Solve the resulting equation. How can you solve the system of linear equations from this point? What is the solution?

5.3 Warm Up

Simplify.

1. $7x - 7x$

2. $5y - (-11y)$

3. $-11a - 16a$

4. $-11xy - 18xy$

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

6. $2x - 6x - 2x$

5.3 Cumulative Review Warm Up

Write the sentence as an absolute value inequality. Then solve the inequality.

1. A number is greater than 5 units from 1.

2. A number is less than 8 units from 4.

3. Half a number is at least 4 units from 15.

4. Triple a number is no more than 9 units from 0.

Name _____ Date _____

5.3 Practice A

In Exercises 1–6, solve the system of linear equations by elimination. Check your solution.

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

2. $4x - y = 5$
$3x + y = 9$

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

4. $-x + y = 9$
$x + 2y = 6$

5. $2x - 3y = 9$
$5x + 3y = 12$

6. $-4x - y = 11$
$4x + 4y = -20$

In Exercises 7–12, solve the system of linear equations by elimination. Check your solution.

7. $x + y = 7$
$5x + 2y = 8$

8. $7x - 6y = 9$
$5x + 2y = 19$

9. $2x - 7y = 5$
$x - y = 10$

10. $3x + 4y = -1$
$-2x - 5y = 10$

11. $-5x + 12y = 8$
$2x - 8y = 0$

12. $-10x + 3y = -30$
$15x - 8y = 45$

13. You and your friend are buying throw blankets with your names embroidered on them. The cost of the throw blanket is x dollars and the cost of each embroidered letter is y dollars. Your name has 6 letters and the total cost is \$29. Your friend's name has 3 letters and the total cost is \$24.50. Find the cost of the throw blanket and the cost of each embroidered letter.

In Exercises 14–16, solve the system of linear equations using any method. Explain why you chose the method.

14. $2x - 5y = 1$
$2x = 9 - 3y$

15. $4x - 6 = -2y$
$x + 9 = y$

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

17. You are ordering T-shirts for the Spanish Club. The table shows the orders for 45 students in the club.

Small	Medium	Large
11	x	y

a. How many students ordered medium and large shirts?

b. The number of students who ordered a medium T-shirt was two less than the number of students who ordered a large T-shirt. Write a system of linear equations that represents the number of students who ordered medium and large T-shirts.

c. Solve the system of linear equations.

d. You are ordering 10 additional medium and large T-shirts for new members who might join the club. Based on your answers in part (c), how many of each size would you order? Explain.

Name_____ Date _____

5.3 Practice B

In Exercises 1–6, solve the system of linear equations by elimination. Check your solution.

1. $2x + y = 10$
$5x - y = 11$

2. $-3x + 2y = 14$
$4x - 2y = -16$

3. $x + 2y = 7$
$13 - 5y = x$

4. $10x - 11 = -3y$
$5y - 5 = -10x$

5. $2y - 4 = 3x$
$2x - 6 = 2y$

6. $8x + 3y = -5$
$3y = x + 4$

In Exercises 7–12, solve the system of linear equations by elimination. Check your solution.

7. $3x - 4y = 19$
$6x + 9y = 21$

8. $4x + 5y = 3$
$-3x + 2y = 38$

9. $8x + 2y = 22$
$5x - 3y = 35$

10. $4x + 7y = 1$
$6x - 3y = 15$

11. $21x - 11y = -9$
$-14x + 8y = 4$

12. $3x + 6y = 6$
$-2x - 9y = -24$

13. Describe and correct the error in solving for one of the variables in the linear system $4x + 5y = -10$ and $2x - 4y = 9$.

✗

Step 1 $4x + 5y = -10$
$2x - 4y = 9$

Step 2 (Multiply by 2.)
$4x + 5y = -10$
$4x - 8y = 18$

Step 3 $-3y = 8$
$y = -\frac{8}{3}$

In Exercises 14–16, solve the system of linear equations using any method. Explain why you chose the method.

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

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

16. $4x - 5y = -3$
$14x + 2y = 9$

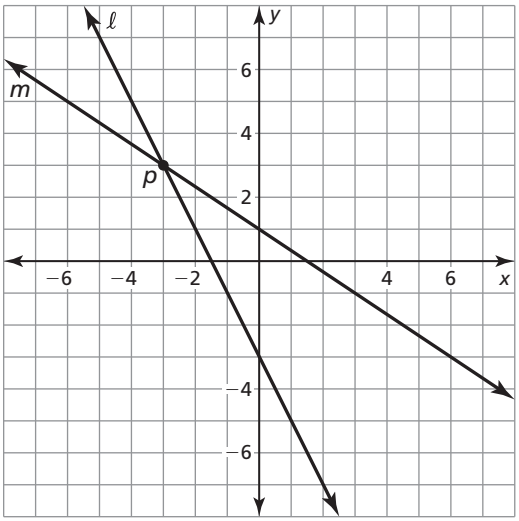
17. You and your friend are making 30 liters of sodium water. You have liters of 10% sodium and your friend has liters of 22% sodium. How many of your liters and how many of your friend's liters should you mix to make 30 liters of 15% sodium?

Name _____ Date _____

5.3 Enrichment and Extension

Proving Systems of Equations

In Exercises 1–10, use the graph.



1. Find the coordinates of point p.
2. Find the equation in slope-intercept form of line m and line ℓ.
3. Verify that point p lies on both lines by substituting its coordinates into both equations.
4. Write the standard form of both lines.
5. Solve the system of equations by substitution.
6. Solve the system of equations by elimination.
7. What does point p do for both equations?
8. Shade below line m, and above line ℓ.
9. Write the inequalities.
10. State a point on the graph that solves both inequalities.

Name_____ Date _____

5.3 Puzzle Time

What Did The Bowling Pins Say To The Bowling Ball?

Write the letter of each answer in the box containing the exercise number.

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

1. $x + 7y = -5$
$-x + y = -3$

2. $6x + y = 25$
$9x - y = 20$

3. $8x + \frac{1}{2}y = 32$
$-x - \frac{1}{2}y = -4$

4. $11x - 6y = -19$
$-11x + 5y = 14$

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

6. $\frac{1}{3}x + y = 6$
$-x - 2y = -9$

7. $5x - 2y = 9$
$2x - 5y = -9$

8. $-2x - 3y = 5$
$-3x - 4y = 9$

9. $7x + 2y = -12$
$3x + 4y = -24$

10. $6x + 5y = 10$
$-2x - 3y = -14$

11. $8x - 9y = -2$
$-3x + 13y = 20$

12. $-12x - 5y = -22$
$8x + 3y = 13$

13. On one reading list, there were a total of 12 fiction and nonfiction books. On the second reading list, there were 2 times as many fiction books and 3 times as many nonfiction books, making a total of 28 books on the second reading list. Solve a system of linear equations to find the number of fiction and nonfiction books on the first reading list.

Answers

A. $(4, 0)$

R. $(-9, 9)$

P. $\left(-\frac{1}{4}, 5\right)$

S. $(3, 7)$

E. $(2, 2)$

S. $(-5, 8)$

U. $(0, 1)$

E. $(2, -1)$

L. $(3, 3)$

S. $(0, -6)$

E. $(1, 5)$

P. $(8, 4)$

A. $(-7, 3)$

13	7	11	3	9	4		10	12	8	6	1		5	2