

3-2

PART 2

Solving Systems Algebraically



Vocabulary

Review

1. Circle the equations that are in *standard form*.

$4x + 3y = 2$

$y = 3x - 5$

$4x - 3 = 2y$

$2x + 5y = 0$

Write each equation in *standard form*.

2. $y = 5x - 3$

3. $y - 4 = 6x$

4. $-y + 3x - 12 = 0$

Vocabulary Builder

equivalent (adjective) ee KWIV uh lunt

Math Usage: If you multiply each side of an equation by the same nonzero number, the new equation and the original equation are **equivalent** to each other.

Definition: Equivalent things are equal to each other.

Example: Two dollars is *equivalent* to eight quarters.

Use Your Vocabulary

Draw a line from each expression in Column A to an *equivalent* expression in Column B.

Column A	Column B
5. two quarters	19
6. $7^2 + 3 \cdot 4$	$4 - x$
7. five nickels	one quarter
8. $(9 + 3) \cdot 2 - 5$	\$.50
9. $3(x - 4)$	61
10. $3x + 4 - 4x$	$3x - 12$



Problem 3 Solving by Elimination

Got It? What is the solution of the system of equations? $\begin{cases} -2x + 8y = -8 \\ 5x - 8y = 20 \end{cases}$

11. Add the equations.

$$\begin{array}{r} -2x + 8y = -8 \\ 5x - 8y = 20 \\ \hline \end{array}$$

$$\begin{array}{r} \boxed{} + \boxed{} = \boxed{} \\ \boxed{} = \boxed{} \end{array}$$

Simplify.

12. Now choose one of the original equations. Substitute and solve.

13. Circle the ordered pair that is the solution of the system of equations.

$(-4, -2)$

$(4, -2)$

$(4, 0)$



Problem 4 Solving an Equivalent System

Got It? What is the solution of the system of equations? $\begin{cases} 3x + 7y = 15 \\ 5x + 2y = -4 \end{cases}$

14. Underline the correct values to complete the sentence.

To get additive inverses for the x -term, multiply the first equation by $\underline{2/3/5}$ and the second equation by $\underline{-2/-3/-7}$.

15. Circle the equivalent system that shows additive inverses for the x -term.

$$\begin{cases} 3x + 7y = 15 \\ 5x + 2y = -4 \end{cases}$$

$$\begin{cases} 6x + 14y = 3c \\ -35x - 14y = 28 \end{cases}$$

$$\begin{cases} 15x + 35y = 75 \\ -15x - 6y = 12 \end{cases}$$

16. Solve the system for y .

17. Then substitute and solve for x .

18. The solution of the system is $(\boxed{}, \boxed{})$.



Problem 5 Solving Systems Without Unique Solutions

Got It? What is the solution of the system of equations? Explain. $\begin{cases} -x + y = -2 \\ 2x - 2y = 0 \end{cases}$

19. Circle the first step in solving the system.

Multiply $-x + y = -2$ by -1 .

Multiply $-x + y = -2$ by 2 .

20. Add $-2x + 2y = -4$ and $2x - 2y = 0$.

$$\begin{array}{r} -2x + 2y = -4 \\ 2x - 2y = 0 \\ \hline \end{array}$$

$$\boxed{} = \boxed{}$$

21. What is the solution of the system?

Place a ✓ in the box if the response is correct.
Place an ✗ if it is incorrect.

☐ The system has no solution.

☐ The system has infinitely many solutions.

Got It? What is the solution of the system of equations? Explain. $\begin{cases} 4x + y = 6 \\ 12x + 3y = 18 \end{cases}$

22. What is the first step in solving the system?

23. Solve the system.

24. What is the solution of the system? Circle the correct answer.

The lines are parallel;
the system has no solution.

The lines are the same; the system
has infinitely many solutions.



Lesson Check • Do you UNDERSTAND?

Vocabulary Give an example of two equivalent systems.

25. Cross out the equation system that is NOT equivalent to the others.

$$\begin{cases} 4y + 5x = 13 \\ 4y - x = 3 \end{cases}$$

$$\begin{cases} y + 5x = 12 \\ 4y - x = 3 \end{cases}$$

$$\begin{cases} 8y + 40x = 96 \\ 8y - 2x = 6 \end{cases}$$



Math Success

Check off the vocabulary words that you understand.

☐ substitution ☐ elimination ☐ equivalent equation ☐ unique solutions

Rate how well you can *solve linear systems algebraically*.

