

Lesson 6-3A Solving Systems by Elimination

Problem 1 Solving a System by Adding Equations

What is the solution of the system? Use elimination. $2x + 5y = 17$
 $6x - 5y = -9$

Got It? 1. What is the solution of each system? Use elimination.

a. $5x - 6y = -32$
 $3x + 6y = 48$

Problem 2 Solving a System by Multiplying One Equation

The theater club sells a total of 101 tickets to its first play. A student ticket costs \$1. An adult ticket costs \$2.50. Total ticket sales are \$164. How many student tickets were sold?

Problem 3 Solving a System by Multiplying One Equation

What is the solution of the system? Use elimination. $-2x + 15y = -32$
 $7x - 5y = 17$

Problem 4 Write a system to model the following situation:

Your school's talent show will feature 12 solo acts and 2 ensemble acts. The show will last 90 min. The 6 solo performers judged best will give a repeat performance at a second 60-min show, which will also feature the 2 ensemble acts. Each solo act lasts x minutes, and each ensemble act lasts y minutes.

HW p 381: 1, 2, 7, 8, 9, 13, 35

Solve each system using elimination.

1. $3x - 2y = 0$
 $4x + 2y = 14$

2. $3p + q = 7$
 $2p - 2q = -6$

Solve each system using elimination.

7. $3x + 3y = 27$
 $x - 3y = -11$

8. $-x + 5y = 13$
 $x - y = 15$

 See Problems 1 and 2.

9. $2x + 4y = 22$
 $2x - 2y = -8$

13. Talent Show Your school's talent show will feature 12 solo acts and 2 ensemble acts. The show will last 90 min. The 6 solo performers judged best will give a repeat performance at a second 60-min show, which will also feature the 2 ensemble acts. Each solo act lasts x minutes, and each ensemble act lasts y minutes.

- Write a system of equations to model the situation.
- Solve the system from part (a). How long is each solo act? How long is each ensemble act?

Solve each system using any method. Explain why you chose the method you used.

35. $y = \frac{2}{3}x + 1$
 $2x + 3y = 27$

Lesson 6-3B Solving Systems by Elimination

Problem 3 Solving a System by Multiplying One Equation

Washing 2 cars and 3 trucks takes 130 min. Washing 2 cars and 5 trucks takes 190 min. How long does it take to wash each type of vehicle?

Problem 4 Solving a System by Multiplying Both Equations

What is the solution of the system? Use elimination.

$$\begin{aligned} 3x + 2y &= 1 \\ 4x + 3y &= -2 \end{aligned}$$

- Got It?** 4. **a.** How can you use the Multiplication Property of Equality to change the equations in this system in order to solve it using elimination?
- $$\begin{aligned} 4x + 3y &= -19 \\ 3x - 2y &= -10 \end{aligned}$$
- b.** Write and solve a revised system.
- c.** Show that the solution of the revised system is a solution of the original system.

6-3.A

More Elimination

When using the elimination method, there are times when you are able to just add the two equations together or multiply one equation by a number to eliminate a variable. Other times, you must multiply both equations by different numbers to eliminate a variable. Today we will learn how to do that.

Example : Solve
$$\begin{aligned} 2x - 7y &= 3 \\ 5x - 4y &= -6 \end{aligned}$$

To eliminate x , multiply the top equation by 5 and the bottom equation by -2

$$\begin{array}{r} 5(2x - 7y = 3) \\ -2(5x - 4y = -6) \end{array} \quad \text{This gives us the equations:} \quad \begin{array}{r} 10x - 35y = 15 \\ -10x + 8y = 12 \end{array}$$

Now add the two equations to solve for y .

$$\begin{array}{r} 10x - 35y = 15 \\ -10x + 8y = 12 \\ \hline -27y = 27 \end{array}$$

$$y = -1$$

Substitute the -1 in for y in either of the two original equations.

$$2x - 7y = 3$$

$$2x - 7(-1) = 3$$

$$2x + 7 = 3$$

$$2x = -4$$

$$x = -2$$

The solution is $(-2, -1)$.

Now it's your turn. Solve the following equations. **Check your solution.**

1.
$$\begin{aligned} 7x - 5y &= 11 \\ -4x - 2y &= -16 \end{aligned}$$

Check:

2. $4x - 2y = -18$
 $-5x + 3y = 23$

Check:

3. $3x + 7y = 10$
 $5x + 2y = 7$

Check:

4. $-2x + 5y = -23$
 $3x - 4y = 24$

Check: