

Study Guide and Intervention

Alg1 9.0

Elimination Using Multiplication

Elimination Using Multiplication Some systems of equations cannot be solved simply by adding or subtracting the equations. In such cases, one or both equations must first be multiplied by a number before the system can be solved by elimination.

Example 1 Use elimination to solve the system of equations.

$$\begin{aligned}x + 10y &= 3 \\4x + 5y &= 5\end{aligned}$$

If you multiply the second equation by -2 , you can eliminate the y terms.

$$\begin{array}{r}x + 10y = 3 \\(+)\ -8x - 10y = -10 \\ \hline-7x \qquad = -7 \\ \frac{-7x}{-7} = \frac{-7}{-7} \\ x = 1\end{array}$$

Substitute 1 for x in either equation.

$$\begin{aligned}1 + 10y &= 3 \\1 + 10y - 1 &= 3 - 1 \\10y &= 2 \\ \frac{10y}{10} &= \frac{2}{10} \\ y &= \frac{1}{5}\end{aligned}$$

The solution is $\left(1, \frac{1}{5}\right)$.

Example 2 Use elimination to solve the system of equations.

$$\begin{aligned}3x - 2y &= -7 \\2x - 5y &= 10\end{aligned}$$

If you multiply the first equation by 2 and the second equation by -3 , you can eliminate the x terms.

$$\begin{array}{r}6x - 4y = -14 \\(+)\ -6x + 15y = -30 \\ \hline11y = -44 \\ \frac{11y}{11} = \frac{-44}{11} \\ y = -4\end{array}$$

Substitute -4 for y in either equation.

$$\begin{aligned}3x - 2(-4) &= -7 \\3x + 8 &= -7 \\3x + 8 - 8 &= -7 - 8 \\3x &= -15 \\ \frac{3x}{3} &= \frac{-15}{3} \\ x &= -5\end{aligned}$$

The solution is $(-5, -4)$.

Exercises

Use elimination to solve each system of equations.

1. $\begin{aligned}2x + 3y &= 6 \\x + 2y &= 5\end{aligned}$

2. $\begin{aligned}2m + 3n &= 4 \\-m + 2n &= 5\end{aligned}$

3. $\begin{aligned}3a - b &= 2 \\a + 2b &= 3\end{aligned}$

4. $\begin{aligned}4x + 5y &= 6 \\6x - 7y &= -20\end{aligned}$

5. $\begin{aligned}4c - 3d &= 22 \\2c - d &= 10\end{aligned}$

6. $\begin{aligned}3x - 4y &= -4 \\x + 3y &= -10\end{aligned}$

7. $\begin{aligned}4s - t &= 9 \\5s + 2t &= 8\end{aligned}$

8. $\begin{aligned}4a - 3b &= -8 \\2a + 2b &= 3\end{aligned}$

9. $\begin{aligned}2x + 2y &= 5 \\4x - 4y &= 10\end{aligned}$

10. $\begin{aligned}6x - 4y &= -8 \\4x + 2y &= -3\end{aligned}$

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

12. $\begin{aligned}2x + y &= 3.5 \\-x + 2y &= 2.5\end{aligned}$

13. GARDENING The length of Sally's garden is 4 meters greater than 3 times the width. The perimeter of her garden is 72 meters. What are the dimensions of Sally's garden?

14. Anita is $4\frac{1}{2}$ years older than Basilio. Three times Anita's age added to six times Basilio's age is 36. How old are Anita and Basilio?

