

Study Guide

Elimination Using Multiplication

Some systems of equations cannot be solved simply by adding or subtracting the equations. One or both equations must first be multiplied by a number before the system can be solved by elimination. Consider the following example.

Example: Use elimination to solve the system of equations

$$x + 10y = 3 \text{ and } 4x + 5y = 5.$$

$$\begin{array}{l} x + 10y = 3 \\ 4x + 5y = 5 \end{array}$$

Multiply $x + 10y = 3$
by -4 .

Then add the
equations.

$$\begin{array}{r} -4x - 40y = -12 \\ \underline{4x + 5y = 5} \\ -35y = -7 \\ y = \frac{1}{5} \end{array}$$

Substitute $\frac{1}{5}$ for y into either original equation and solve for x .

$$\begin{array}{l} x + 10\left(\frac{1}{5}\right) = 3 \\ x + 2 = 3 \\ x = 1 \end{array}$$

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

Use elimination to solve each system of equations.

1. $\begin{array}{l} 3x + 2y = 0 \\ x - 5y = 17 \end{array}$

2. $\begin{array}{l} 2x + 3y = 6 \\ x + 2y = 5 \end{array}$

3. $\begin{array}{l} 3x - y = 2 \\ x + 2y = 3 \end{array}$

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

Use a system of equations and elimination to solve each problem.

5. 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?

6. 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?