

The most convenient way of solving certain systems of equations is by the elimination method or the addition or subtraction method (or elimination method). Some systems of equations are more readily solved by this method than by the substitution method.

Procedure for Solving Systems of Equations by Elimination

1. Eliminate a variable by adding or subtracting the equations so that one equation with one variable remains. It may be necessary to rearrange the equations to align like terms.
2. Solve the resulting equation for the remaining variable.
3. Substitute the value of this variable in either of the two original equations and solve for the other variable.
4. Check your solution by substituting the values of both variables in the two original equations.

Example: $-2x - 3y = -17$
 $5y = 27 - 3x$

Rearrange the bottom equation to get the x and y on the same side.

$$\begin{array}{r} -2x - 3y = -17 \\ 3x + 5y = 27 \end{array}$$

Multiply top equation by 3 and bottom equation by 2 to get the x coefficients to be -6x and 6x.

$$\begin{array}{r} -6x - 9y = -51 \\ + 6x + 10y = 54 \\ \hline y = 3 \end{array}$$

$$\begin{array}{r} -2x - 3y = -17 \\ -2x - 3(3) = -17 \\ -2x - 9 = -17 \\ -2x = -8 \\ x = 4 \end{array}$$

Solution is **(4, 3)**

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Solving Systems of Equations by Elimination Part 2

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Solve each of the following systems of equations by the elimination method.

1.
$$\begin{cases} 2x+y=7 \\ 4x-2y=-6 \end{cases}$$

2.
$$\begin{cases} 7x+4y=10 \\ x+3y=16 \end{cases}$$

3.
$$\begin{cases} 3x-2y=-9 \\ 12x-4y=0 \end{cases}$$

4.
$$\begin{cases} 5x=-y+34 \\ 2x=3y \end{cases}$$