

Section 7.5 Using Elimination to Solve a Linear System

#2: Solving a Linear System by Elimination

A system of equations has two equations and two variables.
The goal is to: **Get one variable by eliminating the other!**

A variable can be eliminated by making it zero when the equations are added or subtracted.

Example 1 Solve the linear system using elimination.

$$\begin{aligned} \text{a)} \quad & 2x + y = -7 \\ & x + y = -4 \end{aligned}$$

Step 1: Choose a variable to eliminate.

Which variable is the easiest to make zero and how?

Step 2: Solve for the remaining variable.

Step 3: Remember the solution is an ordered pair (x,y). Substitute your answer into either equation to determine the other variable.

Note:

- Each answer can be checked to see if it is correct.
 - There is more than one way to eliminate a variable, however the solution will be the same.
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$$\begin{aligned} \text{b)} \quad & 3x + 9y = 5 \\ & -6y + 9x = -7 \end{aligned}$$

Note: Make sure the same variables (and constant terms) are lined up with each other.

Your Turn

$$\begin{aligned} \text{c)} \quad & 15x - 2y = 9 \\ & 5x + 4y = 17 \end{aligned}$$

Example 2 Solve each system using elimination. What do you notice?

$$\begin{aligned} \text{a)} \quad & 3y - 2x = -3 \\ & 6y - 4x = 12 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & x + y = 2 \\ & -3x - 3y = -6 \end{aligned}$$

Example 3 Solve the system using elimination.

$$\begin{aligned} \text{a)} \quad & 3x - 4y = 7 \\ & 5x - 6y = 8 \end{aligned}$$

Hint: To eliminate a variable multiply each equation by an integer so that zero can be obtained.

Your Turn

$$\begin{aligned} \text{b)} \quad & 2x + 7y = 24 \\ & 3x - 2y = -4 \end{aligned}$$

Example 4 Solve the system.

a) $\frac{2}{3}x - \frac{1}{2}y = 4$

$$\frac{1}{2}x - \frac{1}{4}y = \frac{5}{2}$$

Eliminate fractions first!

b) $-\frac{1}{2}x + \frac{3}{8}y = 18$

$$\frac{2}{3}x + \frac{3}{4}y = 16$$

Your Turn

c) $\frac{3}{4}x - y = 2$

$$\frac{1}{8}x + \frac{1}{4}y = 2$$

Work Book QuestionsSec 7.5: p.437 #3ab, 6ac, 7ab,
12bd**Extra Practice Questions**Sec 7.5: p.437 #3cd, 6bd, 7cd,
12ac, 20