

Lesson: Solving Systems of Equations by Elimination (Day 1)

We are already familiar with solving a system of linear equations using a **graph** or the **method of substitution**. We are now going to learn an alternate method called **elimination**. You will see sometimes that doing substitution may not be the most efficient way to solve the system.

Review the **method of substitution** and the differences to solve each of the following systems of equations:

Review #1

$$y = -3x + 4$$
$$y = 4x - 10$$

Review #2

$$y = x - 4$$
$$-4x - 6y = -16$$

Look at the following system of linear equations.

Notes

How does this differ from our two examples above?
Can we solve this in an easier way rather than moving things?

$$x - y = 11$$
$$2x + y = 19$$

Use the **method of elimination** to solve each of the following systems of equations. Be sure to find **x and y**.

Exercise #1

$$2x - 3y = 12$$
$$x + 3y = 6$$

Exercise #2

$$2x + 2y = -2$$
$$3x - 2y = 12$$

Exercise #3

$$6x + 5y = 4$$
$$-6x + 7y = 20$$

Exercise #4

Why is this different?

$$3x + 3y = 6$$
$$3x - y = -6$$

To avoid subtraction like in Exercise #4 we can change one of our existing equations so we can add!

Method: _____

Exercise #5

$$\begin{aligned}6x - 3y &= 6 \\6x + 8y &= -16\end{aligned}$$

Exercise #6

$$\begin{aligned}4x + 3y &= 19 \\6x + 3y &= 33\end{aligned}$$

Exercise #7

$$\begin{aligned}2x + 6y &= 17 \\2x - 10y &= 9\end{aligned}$$

Practice solving each of the systems below using the **elimination method**.

1.

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

2.

$$\begin{aligned}3x + y &= 23 \\3x - 2y &= 8\end{aligned}$$

3.

$$\begin{aligned}-4x - 5y &= 7 \\3x + 5y &= -14\end{aligned}$$

4.

$$\begin{aligned}x - 2y &= -19 \\5x + 2y &= 1\end{aligned}$$

5.

$$\begin{aligned}3x + 4y &= 18 \\-2x + 4y &= 8\end{aligned}$$

6.

$$\begin{aligned}-5x + 7y &= 11 \\-5x + 3y &= 19\end{aligned}$$

Application Problem.

At the county fair, the Baxter family bought 6 hot dogs and 4 juice drinks for \$16.70. The Farley family bought 3 hot dogs and 4 juice drinks for \$10.85. Find the price of a hot dog and the price of a juice drink.

Represent Real-World Problems Marta bought new fish for her home aquarium. She bought 3 guppies and 2 platies for a total of \$13.95. Hank also bought guppies and platies for his aquarium. He bought 3 guppies and 4 platies for a total of \$18.33. Find the price of a guppy and the price of a platy.