

Solving Systems of Linear Equations using Algebra

ELIMINATION!!!

What do you think that means???

Use elimination to determine if this system has one solution, no solution, or infinitely many solutions. Let's look at the following system:

$$x - y = 11$$

$$2x + y = 19$$

Which term could we easily eliminate and why?

Strategy Add or subtract the equations to eliminate one variable.

Solve for the remaining variable and use its value to find the value of the other variable.

If the coefficients of the term we want to eliminate are opposites we add.

$$x - y = 11$$

$$2x + y = 19$$

Check:

Example 2:

Use elimination to solve the system of equations. Check your solution.

Which term is easiest to eliminate?

*If the coefficients of the term we want to eliminate are the same we subtract.

$$2x + 3y = 18$$

$$x + 3y = -21$$

Check:

Example 3:

Solve the system by elimination.

$$4x + 3y = 16$$

$$2x - 3y = 8$$

Check:

Example 4:

Solve each system by elimination.

$$2x + y = -6$$

$$3x + y = -10$$

Check:

Sometimes, it is not possible to eliminate a variable by adding or subtracting the equations.

When this is the case, you need to multiply one or both equations by a nonzero number in order to create a common coefficient. Then add or subtract the equations.

Examine each system of equations.

Which variable would you choose to eliminate?

What do you need to multiply each equation by?

$2x + 5y = -1$ $x + 2y = 0$ Eliminate: Multiply by:	$3x + 6y = 6$ $2x - 3y = 4$ Eliminate: Multiply by:	$x + 2y = -7$ $x - 5y = 7$ Eliminate: Multiply by:
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Let's solve these systems using elimination.

$$2x + 5y = -1$$

$$x + 2y = 0$$

Check:

$$3x + 6y = 6$$

$$2x - 3y = 4$$

Check:

Let's solve these systems using elimination.

$$x + 2y = -7$$

$$x - 5y = 7$$

Check:

How do you decide which variable to eliminate?

First, look to see if one variable has the same or opposite coefficients. If so, eliminate that variable.

Second, look for which coefficients have a simple least common multiple. Eliminate that variable.