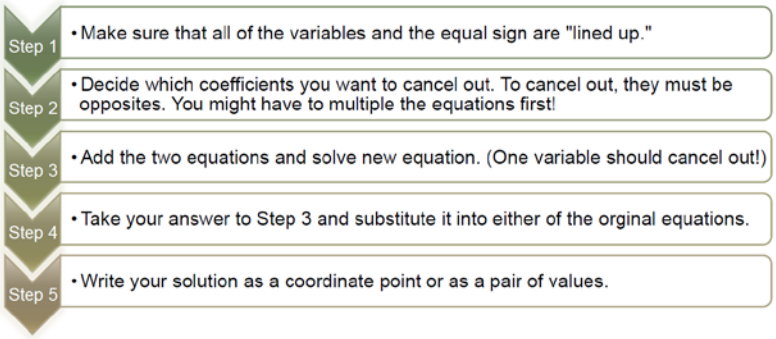
Write your questions here!

We have learned how to solve linear systems by graphing and substitution. Now we will learn how to solve the linear systems by using a method called _____.

Steps for Solving Linear Systems by Elimination



Example 1: Solve the linear system using elimination:

$$3x - 4y = 10$$
$$5x + 4y = 6$$

Step 1: Do you have x over x, y over y and equal sign over equal sign? Yup! Continue on….

Step 2: The y's are already opposites. Our work here is done.

Step 3: Add the two equations. Solve the resulting equation.

Step 4: Take the answer from **Step 3** and plug it into either of the original equations and solve for the other unknown variable.

Step 5: Write your solution as a coordinate point or as a pair of values.

Write your questions here!

More Examples:

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

3. $x + 2y = 4$
$-6x + 2y = -10$

4. $4x - 3y = 8$
$2x - 2y = 0$

5. $9x + 2y = 39$
$6x + 13y = -9$

Now, summarize your notes here!

Practice 8.3 Systems of Equations (Elimination)

Show all of your work!

Solve each system by elimination.

1) $-4x - 4y = 8$
$-x + 4y = 12$

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

3) $x - 2y = -9$
$-4x - 2y = -4$

4) $-2x + y = 4$
$-2x + 2y = 0$

5) $-4x - y = 8$
$-12x + 3y = -24$

6) $-x + 4y = -1$
$-2x - 8y = 14$

7) $-6x + 3y = 3$
$5x - 8y = -8$

8) $4x - 3y = -16$
$5x + 2y = 3$

9) $3x + 2y = 10$
$4x + 5y = 18$

10) $-5x - 6y = -3$
$2x + 4y = 6$

11) Is the point (0, 0) a solution of the system of linear equations below?

$2x + y = 2$
$4x - 2y = 2$

12) Is the point $(\frac{5}{4}, 7)$ a solution of the system of linear equations below?

$4x + y = 12$
$-4x + 3y = 16$

Application and Extension

1. Solve the following system of equations using elimination.

$$2x + 2y = 2$$
$$-8x + 4y = 16$$

2. You have just enough coins to pay for a loaf of bread priced at $1.95. You know you have a total of 12 coins, with only quarters and dimes. Let Q = the number of quarters and D = the number of dimes. Complete:

_____ + _____ = 12 Representing the number of coins.

0.10_____ + 0.25_____ = $1.95 Representing the value of the coins.

Now, solve the linear system using elimination. *(Hint: Multiply the second equation by -10!)*

3. The table shows the number of apples needed to make apple pies and applesauce sold at a farm store. During a recent picking at the farm, 169 Granny Smith apples and 95 Red Delicious apples were picked. Write and solve a system to determine how many apple pies and how many batches of applesauce can be made if every apple is used. *(Hint: read across each row to create your equations!)*

Type of Apple	# Needed for π (Pie)	# Needed for Sauce	Total
Granny Smith	5	4	169
Red Delicious	3	2	95

3. The Algebros are visting Michigan State University when they stumble upon a Girl Scout selling cookies. Sully orders 3 boxes of Tagalongs and 4 boxes of Somoas for $26. Brust isn't statisfied with such a small order and yells "**UPGRADE**!!" He then upgrades the order to 5 boxes of Tagalongs and 6 Boxes of Somoas which costs $41.

a. Write a system of linear equations to model the situation.
(Let x = cost of a box of Tagalongs and y = cost of a box of Somoas.)

b. Solve your system of equations above using elimination to find the cost of each type of cookie.