

[8.3: SOLVING SYSTEMS BY ELIMINATION] 1

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 **elimination**.

Steps for Solving Linear Systems by Elimination

- Step 1 • Make sure that all of the variables and the equal sign are "lined up."
- Step 2 • Decide which coefficients you want to cancel out. To cancel out, they must be opposites. You might have to multiple the equations first!
- Step 3 • Add the two equations and solve new equation. (One variable should cancel out!)
- Step 4 • Take your answer to Step 3 and substitute it into either of the original equations.
- Step 5 • Write your solution as a coordinate point or as a pair of values.

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.

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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.

$$\begin{array}{l} 1) \quad -4x - 4y = 8 \\ \quad \quad -x + 4y = 12 \end{array}$$

$$\begin{array}{l} 2) \quad 3x + 2y = -3 \\ \quad \quad -3x + y = 12 \end{array}$$

$$\begin{array}{l} 3) \quad x - 2y = -9 \\ \quad \quad -4x - 2y = -4 \end{array}$$

$$\begin{array}{l} 4) \quad -2x + y = 4 \\ \quad \quad -2x + 2y = 0 \end{array}$$

$$\begin{array}{l} 5) \quad -4x - y = 8 \\ \quad \quad -12x + 3y = -24 \end{array}$$

$$\begin{array}{l} 6) \quad -x + 4y = -1 \\ \quad \quad -2x - 8y = 14 \end{array}$$

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

$$\begin{aligned} 8) \quad & 4x - 3y = -16 \\ & 5x + 2y = 3 \end{aligned}$$

$$\begin{aligned} 9) \quad & 3x + 2y = 10 \\ & 4x + 5y = 18 \end{aligned}$$

$$\begin{aligned} 10) \quad & -5x - 6y = -3 \\ & 2x + 4y = 6 \end{aligned}$$

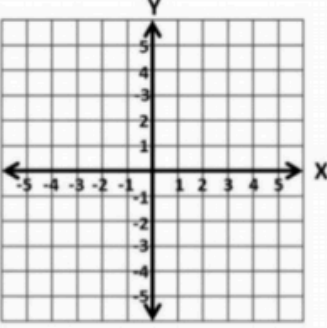
11) Is the point $(0, 0)$ a solution of the system of linear equations below?

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

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

$$\begin{aligned} 4x + y &= 12 \\ -4x + 3y &= 16 \end{aligned}$$

SKILLZ REVIEW

Solve for x.	Evaluate if $x = -1$	Graph and label each line.
1. $-12x = 3(x - 2)$	3. $2x^3 - 3x$	5. Graph the line $y = -5x + 4$ 
2. $-28 = -1 - \frac{x}{4}$	4. $6 - 5x^4$	
		6. Graph the line $y = -\frac{1}{2}x + 2$

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Application and Extension

Underline key concepts and focus on the last sentence.

Remember to LABEL, LABEL, LABEL!

1. The Algebros are visiting 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 satisfied 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.



2. Willy Wonka sold 28 boxes of candy for a total of \$2,220. Scrumdiddlyumptious chocolate bars cost \$70 per box. Everlasting Gobstoppers cost \$90 per box. How many of each box were sold?

A) Let Statements:

B) System:

C) Answer:

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

4. At Rita's, ice cream cones cost \$.90 and sundaes cost \$1.65. One day, the receipts for a total of 148 cones and sundaes were \$180.45. How many cones were sold?

A) Let Statements:

B) System:

C) Answer:

3. Mr. Curran loves Ooka and places two orders, one at lunch and one at dinner. At lunch, Mr. Curran's order was for 7 rolls of sushi and 2 cups of miso soup for \$85. At dinner, his order was for 19 rolls of sushi and 6 cups of miso for \$233. What are the individual prices for a sushi roll and a cup of miso soup?

A) Let Statements:

B) System:

C) Answer:

D) How much would it cost if he ordered 9 rolls of sushi and 3 cups of miso soup?

8.3 Mini 3 Act Math Activities

More Advanced Problems & Applications (Decimal Answers Allowed)

1. Sticky Situation:



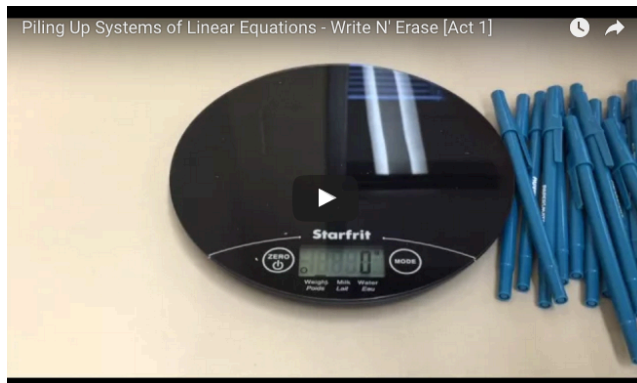
a) **Act 1** - After watching the Act 1 video, what questions comes to mind?

b) Guess:

c) **Act 2** – What information was revealed in the video?

d) **Act 3** – Solution

2. Write 'N Erase:



a) **Act 1** - After watching the Act 1 video, what questions comes to mind?

b) Guess:

c) **Act 2** – What information was revealed in the video?

d) **Act 3** – Solution

3. Counting Candy:



a) **Act 1** - After watching the Act 1 video, what questions comes to mind?

b) Guess:

c) **Act 2** – What information was revealed in the video?

d) **Act 3** – Solution