

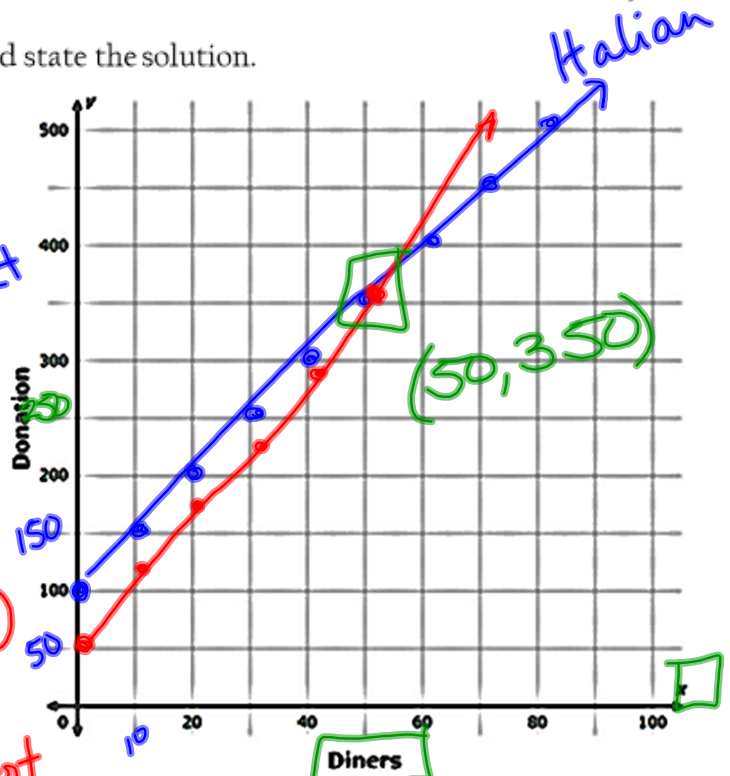
Warm Up:

A charity is considering the possibility of having a benefit night at two different restaurants. The owner of the local Italian restaurant has offered to make a donation of \$100 and \$5 per dinner that night. On the other hand, the owner of the Mexican restaurant has said he could contribute \$50 plus \$6 per dinner. Based on the number of diners who have promised to participate in the event, it appears that each restaurant would donate the same total amount. How many diners promised to participate?

Write a system of equations, graph them, and state the solution.

Italian:
 $y = 5x + 100$
 ↑ 5 × 10
 → 1 × 10
 ↑ start

Mexican
 $y = 6x + 50$
 ↑ 50
 → 10
 ↑ start



X	Y1
74	
80	
86	
92	
98	
104	
110	

X=10

X	Y1
14	134
15	140
16	146
17	152
18	158
19	164
20	170

X=20

50 dinERS

\$350 donated

Solving Systems of Equations Algebraically

Step 1: Line up the equations

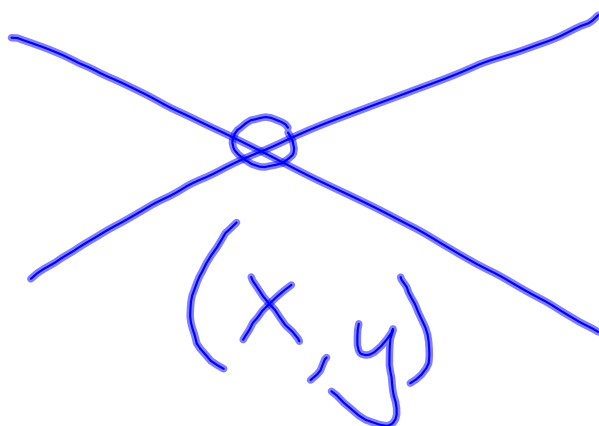
Step 2: Check if any coefficients match (if yes, skip to step 4)

Step 3: Multiply each equation by leading coefficient of opposite one

Step 4: Subtract each column

Step 5: Solve for the remaining variable.

Step 6: Substitute your solution into one of the original equations to solve for the other variable.



$$\begin{array}{r} 3x - 10y = 14 \\ -3x - 9y = 15 \end{array}$$

$$\begin{array}{r} -y = -1 \\ -4 \quad -1 \end{array}$$

$$\boxed{y = 1}$$



$$\begin{array}{r} 4x + 2y = 6 \\ -2x + 2y = 18 \end{array}$$

$$\begin{array}{r} 6x = -12 \\ 6 \quad 6 \end{array}$$

$$\boxed{x = -2}$$

$$3x - 9y = 15$$

$$3x - 9(1) = 15$$

$$\begin{array}{r} 3x - 9 = 15 \\ +9 \quad +9 \end{array}$$

$$\begin{array}{r} 3x = 24 \\ 3 \quad 3 \end{array}$$

$$\boxed{x = 8}$$

$$4x + 2y = 6$$

$$4(-2) + 2y = 6$$

$$\begin{array}{r} -8 + 2y = 6 \\ +8 \quad +8 \end{array}$$

$$\begin{array}{r} 2y = 14 \\ 2 \quad 2 \end{array}$$

$$\boxed{y = 7}$$

$$\begin{array}{r} 4x + 8y = 20 \\ + \quad -4x + 2y = -30 \\ \hline \end{array}$$

$$\frac{10y = -10}{10 \quad 10}$$

$$\boxed{y = -1}$$



$$4x + 8y = 20$$

$$4x + 8(-1) = 20$$

$$\begin{array}{r|l} 4x + -8 = 20 & \\ +8 & +8 \\ \hline x + 28 & \\ \hline 4 & 4 \\ \hline \end{array}$$

$$\boxed{x = 7}$$

Eliminate It

$$1) \quad x + 2y = 4$$

$$\begin{array}{r} + \\ -x - 4y = -14 \end{array}$$

$$\begin{array}{r} -2y \quad | \quad -10 \\ -2y \quad | \quad -10 \\ \hline y \quad | \quad 5 \end{array}$$

$$\begin{array}{r} x + 2(5) = 4 \\ \hline x + 10 = 4 \end{array}$$

$$\begin{array}{r} x + 10 = 4 \\ -10 \quad | \quad -10 \\ \hline x \quad | \quad -6 \end{array}$$

$$2) \quad 5x - 6y = 6$$

$$-5x + 4y = -14$$

Eliminate It

$$\begin{aligned} 3) \quad & 5x - 6y = 6 \\ & -5x + 4y = -14 \end{aligned}$$

$$\begin{aligned} 4) \quad & 2x - 2y = -12 \\ & 5x + 2y = 5 \end{aligned}$$

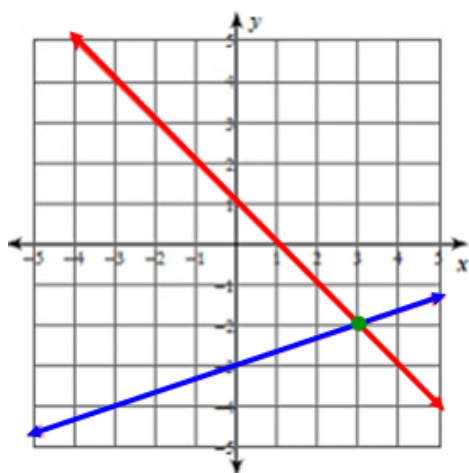
Eliminate It

$$\begin{aligned} 5) \quad & -4x - 2y = -12 \\ & 4x + 8y = -24 \end{aligned}$$

$$\begin{aligned} 6) \quad & 4x + 8y = 20 \\ & -4x + 2y = -30 \end{aligned}$$

Warm Up!

Write the equations for the system of linear equations shown below ***AND*** state the coordinates of the solution:



$$y = \underline{\hspace{2cm}}$$

$$y = \underline{\hspace{2cm}}$$

$$y = mx + b$$

$$\begin{aligned}x + y &= 15 \\ -3x + 2y &= 30\end{aligned}$$

A graphic with a yellow-to-orange gradient background. The text "Elimination Time!" is written in a white, bold, sans-serif font with a black outline, slanted upwards to the right.

**Elimination
Time!**



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

$$\begin{aligned}2x - 3y &= 0 \\-4x + 2y &= 0\end{aligned}$$

$$\begin{aligned}x + 4y &= 7 \\4x - 3y &= 9\end{aligned}$$

Elimination

$$\begin{aligned}2x - 3y &= 1 \\x + 2y &= -3\end{aligned}$$

$$\begin{aligned}4x + y &= 0 \\ x - 3y &= 26\end{aligned}$$



eliminate

$$\begin{aligned}x - y &= 1 \\ 3x - 4y &= 12\end{aligned}$$

**TRY IT
NOW!**

$$\begin{aligned}10x + 5y &= 30 \\ 3x + 11y &= 28\end{aligned}$$

$$\begin{aligned}5x - 2y &= -5 \\ 6x + 6y &= -6\end{aligned}$$

HOMEWORK! HOMEWORK!! HOMEWORK!!!

Solve each of the systems of equations below using the elimination method

$$\begin{aligned}x + 3y &= 9 \\ -2x + 4y &= -8\end{aligned}$$

$$\begin{aligned}7x - 2y &= 3 \\ x + y &= 3\end{aligned}$$



The text "WARM UP!" is written in a large, bubbly, orange-to-yellow gradient font with a black outline and a slight shadow effect.

Solve the following system of equations algebraically.

$$2x + 4y = 6$$

$$3x + 6y = 12$$

Systems of Equations Word Problems
(solved algebraically)

The equations $6x+5y=300$ and $3x+7y=285$ represent the money collected from selling gift baskets in a school fundraising event. If x represents the cost for each snack gift basket and y represents the cost for each chocolate gift basket, what is the cost for each chocolate gift basket?



(a) \$20

(b) \$25

(c) \$30

(d) \$54

Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for \$19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for \$24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies. Write a system of equations that describes the given situation. On the set of axes below, graph the system of equations. Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.



Jack bought 3 slices of cheese pizza and 4 slices of mushroom pizza for a total cost of \$12.50. Grace bought 3 slices of cheese pizza and 2 slices of mushroom pizza for a total cost of \$8.50. What is the cost of one slice of mushroom pizza?



a) Write an equation for Jack

b) Write an equation for Grace

c) Solve

An animal shelter spends \$4.00 per day to care for each bird and \$4.50 per day to care for each cat. Lincoln noticed that the shelter spent \$175.50 caring for birds and cats on Wednesday. Lincoln found a record showing that there were a total of 41 birds and cats on Wednesday.

Write a system of equations to represent this scenario.



How many birds were at the shelter on Wednesday?

Sydney and Mila go to the movie theater and purchase refreshments for their friends.

Sydney spends a total of \$28.50 on 9 drinks and 2 bags of popcorn.

Mila spends a total of \$42.50 on 5 drinks and 10 bags of popcorn.



Write a system of equations that can be used to find the price of one drink and the price of one bag of popcorn.

Using these equations, determine and state the price of each, to the nearest cent.

Matt and Ming are selling fruit for a school fundraiser. Customers can buy small boxes of oranges and large boxes of oranges. Matt sold 3 small boxes of oranges and 14 large boxes of oranges for a total of \$203. Ming sold 11 small boxes of oranges and 11 large boxes of oranges for a total of \$220. Find the cost each of one small box of oranges and one large box of oranges.

a) Write an equation for Matt

b) Write an equation for Ming

c) Now solve for the cost of the small and large boxes of oranges



The admission fee at a small fair is \$1.50 for children and \$4.00 for adults. On a certain day, 2200 people enter the fair and \$5050 is collected. How many children and how many adults attended?



