

Essential Question: How can we solve a system of linear equations algebraically?

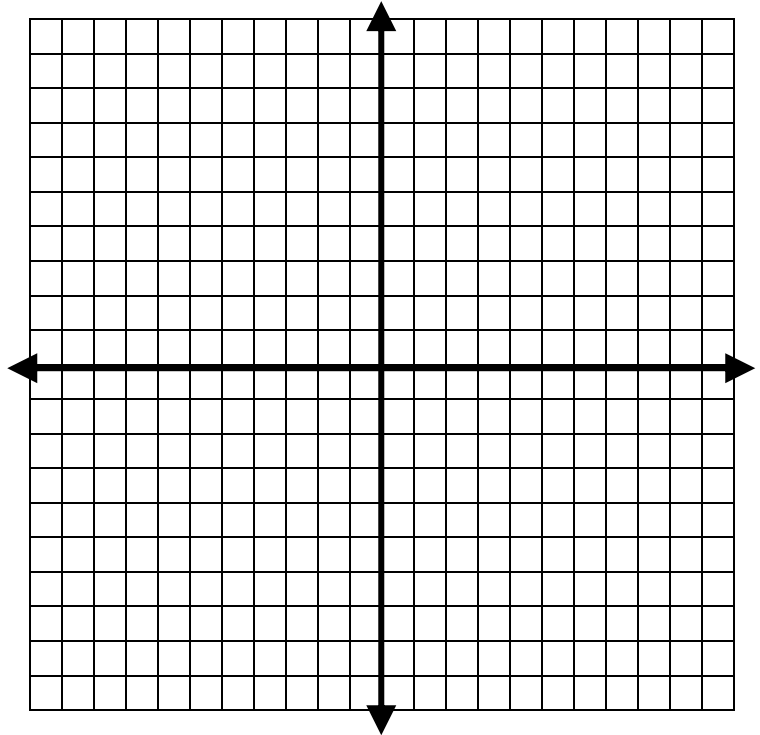
Do Now: Find the solution to the following system of linear equations.

Solve the following system of equations.

$$y = 3x$$

$$2y + x = 14$$

Whether you use a table of values, intercept or slope-intercept method to graph the system of equations, be sure to show all work.



Solution _____

Check:



Is there another way to solve this system?

$$y = 3x$$

$$2y + x = 14$$

Using the Substitution Method to solve Linear Systems

1) $x = y + 1$
 $x + 2y = 10$

2) $x - 4y = -1$
 $2x + 2y = 3$

3) Members of the Cinema Arts Theater pay an annual membership fee of \$15 and view movies for \$2 each. Nonmembers pay \$3 for each movie viewing.

a) Write an equation that represents the cost (C) of viewing m movies for members in one year.

b) Write an equation that represents the cost (C) of viewing m movies for nonmembers in one year.

c) Solve the system. What does the solution tell us in the context of the situation?

d) When is it beneficial to become a member of the theater?

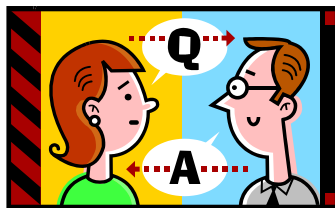
The TAKEAWAY

Solving Systems using the Substitution Method

- 1) Solve for _____ or _____ in one of the equations.
- 2) _____ the expression that represents x or y into the other equation and _____ for the variable.
- 3) Solve for the other variable using either equation.
- 4) Always _____ your solution (x, y) with both equations.

Turn and Talk.

1. Given the following system:
$$\begin{aligned} 2x &= 8 - 5y \\ x + y &= 1 \end{aligned}$$

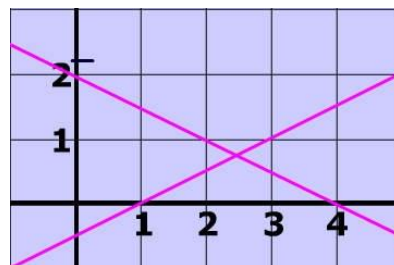


Which equation would you choose to solve for a variable? What variable would you solve for? Why?

2. Given the system:
$$\begin{aligned} x + 2y &= 4 \\ y &= 2x + 7 \end{aligned}$$

Explain why it is OK to substitute $2x + 7$ for y in $x + 2y = 4$?

3. Examine the linear system graphed to the right.
Why would you want to solve this system algebraically?



Solve each system algebraically and check your solution.

1. $y = 3x$
 $5x + 2y = 44$

2. $x = 5y - 1$
 $x + 2y = 13$

3. $-3x + y = 7$
 $5x + 2y = 3$

4. Kasey sells athletic shoes at a department store. She earns \$500 per month plus a 4% commission on her total sales. Kyle also sells athletic shoes at the same store but he earns \$400 per month plus a 5% commission on total sales.
- a. Write a system of equations that represent the total earnings of Kasey and Kyle in one month. Let x represent the amount of money generated in sales and let y represent the total amount of money earned. [Hint: *Percents need to be changed to decimals.*]
- b. Solve the system algebraically. What is the solution? What does it mean in the context of the problem?