DIGITAL

NAME ______________________________

Module 10 Solving Systems of Linear Equations and Inequalities
Lesson 1 Solving Systems of Linear Equations by Graphing

independent practice

Determine whether the given point is a solution to the system.

1. (1, 1) $\begin{cases} x = 1 \\ y = 1 \end{cases}$

Yes

2. (–2, 1) $\begin{cases} x + y = -1 \\ y = 5x + 11 \end{cases}$

Yes

3. (–1, 6) $\begin{cases} x - 2y = -13 \\ y = 2x + 17 \end{cases}$

No

4. (4, –2) $\begin{cases} 5x - 4y = 28 \\ y = x - 4 \end{cases}$

No

5. (5, –1) $\begin{cases} 3x - 2y = 17 \\ 2x + 7y = 3 \end{cases}$

Yes

6. (0, 0) $\begin{cases} y = x \\ y = -x \end{cases}$

Yes

7. (–3, 0) $\begin{cases} 7x - 5y = 31 \\ 2x - 3y = 19 \end{cases}$

No

8. (9, –1) $\begin{cases} y = -3x + 2 \\ y = 3x - 7 \end{cases}$

No

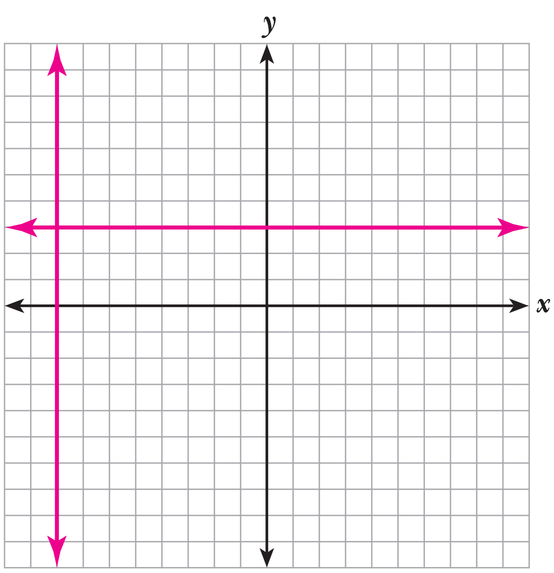
9. (4, 5) $\begin{cases} 6x - 3y = 9 \\ 11x + 2y = 54 \end{cases}$

Yes

Solve each system by graphing.

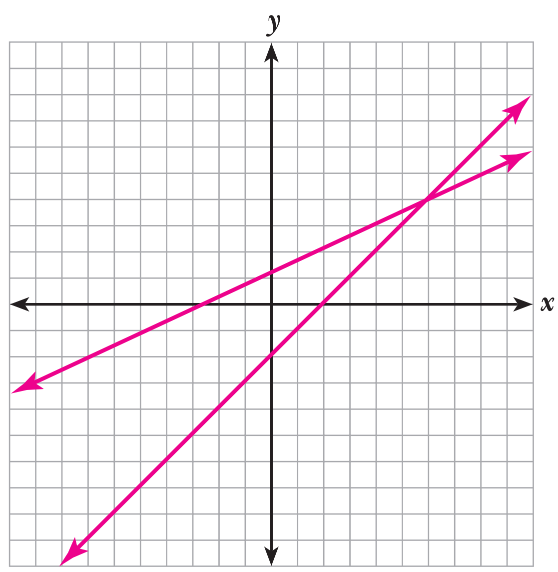
10. $\begin{cases} y = 3 \\ x = -8 \end{cases}$

(–8, 3)



11. $\begin{cases} y = x - 2 \\ y = \frac{1}{2}x + 1 \end{cases}$

(6, 4)

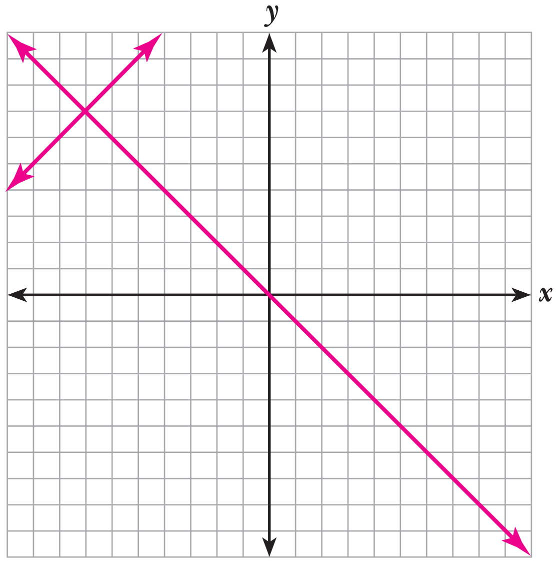


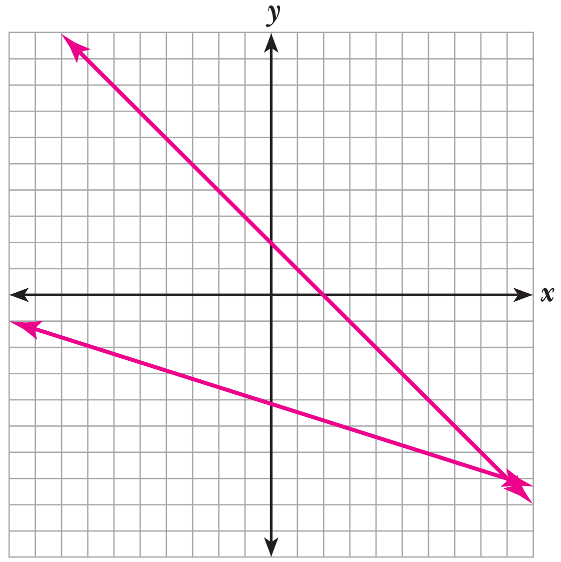
12. $\begin{cases} x + y = 0 \\ x - y = -14 \end{cases}$

(–7, 7)

13. $\begin{cases} y = -\frac{1}{3}x - 4 \\ y = -x + 2 \end{cases}$

(9, –7)



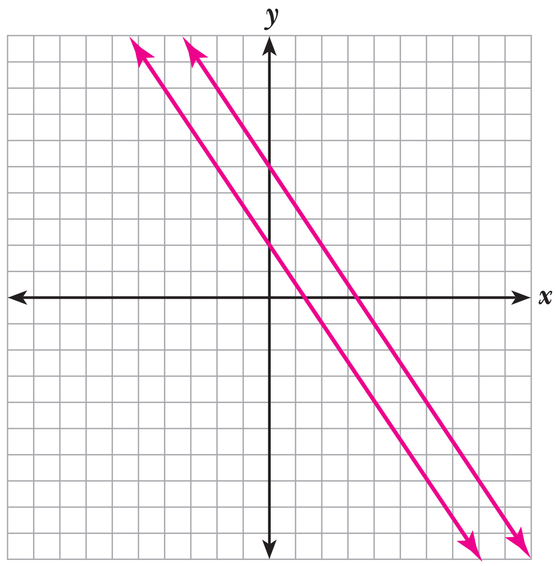


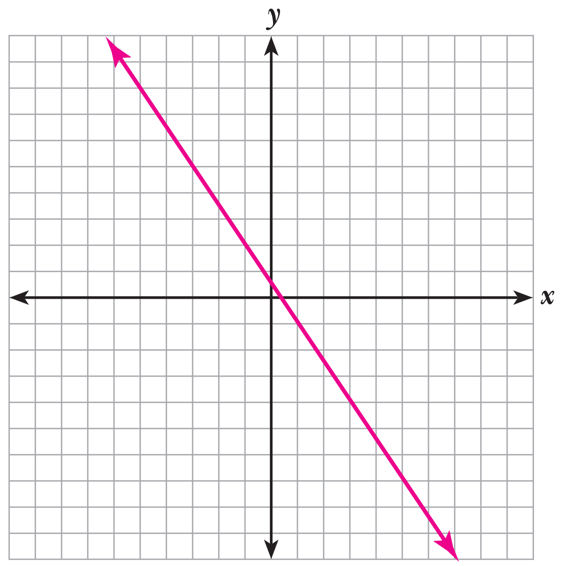
14. $\begin{cases} 3x + 2y = 4 \\ 6x + 4y = 20 \end{cases}$

No solution; lines are parallel

15. $\begin{cases} 2y = -3x + 1 \\ y = -\frac{3}{2}x + \frac{1}{2} \end{cases}$

An infinite number of solutions. The lines coincide.



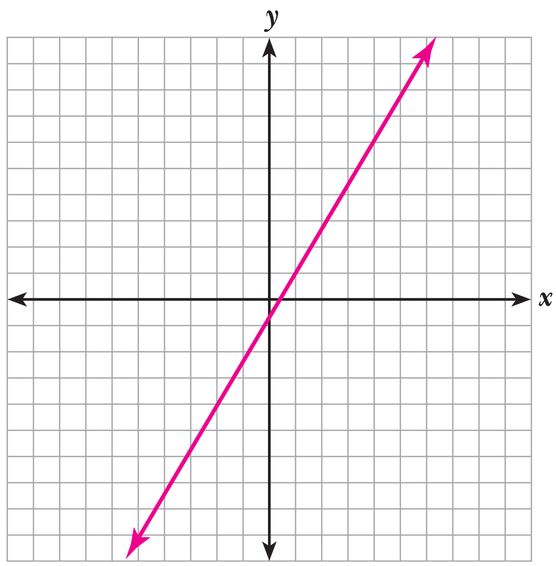


Possible Journal Response

1. One advantage to the graphing method is that the graphs provide a picture of the solution set for a system of equations. The different possibilities, one solution, an infinite number of solutions, or no solution, are clearly presented and easily seen and understood using the graphing method. A disadvantage is that large numbers and non-integer solutions are more difficult to locate using the graphing method. Graphs must be precise in order to correctly find the point of intersection.
2. A system of equations will have no solution whenever the lines are parallel. This means the equations in the system will have the same slope and different *y*-intercepts.

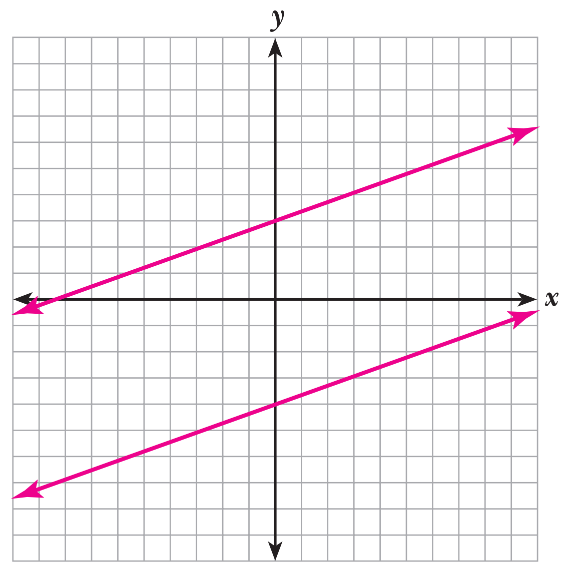
16. $\begin{cases} y = 2x - 1 \\ 8x - 4y = 4 \end{cases}$

An infinite number of solutions. The lines coincide.



17. $\begin{cases} x - 3y = 12 \\ y = \frac{x}{3} + 3 \end{cases}$

No solution; lines are parallel



Journal

1. What are the advantages and disadvantages of using the graphing method to solve systems of equations?
2. Explain when a system of equations has no solution.
3. Is it possible for a system of equations to have ***exactly*** two solutions? Why or why not?
4. Explain how to graph a line from an equation written in standard form.
5. Patti says the point (2, 3) is the solution to this system of equations $\begin{cases} y = 4x - 5 \\ 12x - 3y = 15 \end{cases}$.

   Daniel said the solution is (–1, –9). Who is correct and why?

Cumulative Review

Solve each equation for the indicated variable.

1. $3x + 2y = 6$; y

$y = -\frac{3}{2}x + 3$

2. $2x - 5y = 30$; y

$y = \frac{2}{5}x - 6$

3. $P = 2l + 2w$; l

$l = \frac{P - 2w}{2}$

4. $t + 3r = 6$; r

$r = 2 - \frac{t}{3}$

5. $C = \pi d$; d

$d = \frac{C}{\pi}$

6. $4c + 2b = 10$; c

$c = -\frac{1}{2}b + \frac{5}{2}$

7. $\frac{3}{2} + 4y = 9$; y
$y = \frac{15}{8}$

8. $A = lw$; w
$w = \frac{A}{l}$

9. $A = \frac{1}{2}(b_1 + b_2)h$; b_2
$b_2 = \frac{2A}{h} - b_1$

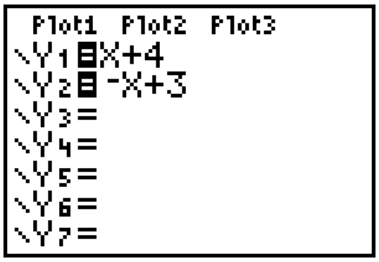
10. $A = \frac{1}{2}bh$; b
$b = \frac{2A}{h}$

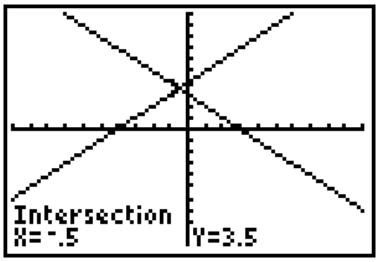
Calculator Problems

Solve $\begin{cases} y = x + 4 \\ y = -x + 3 \end{cases}$

To solve a system of equations with a graphing calculator:

1. Enter the functions into Y_1= and Y_2=.
2. From the CALC menu, select **5:INTERSECT.** The graphs of Y_1 and Y_2 are displayed with **First curve?** In the bottom-left corner.
3. Press ENTER. **Second curve?** is displayed in the bottom-left corner.
4. Press ENTER. **Guess?** is displayed in the bottom-left corner.
5. Press the right or left arrow keys to move the cursor to the point that is your guess as the point of intersection.
6. Press ENTER. The cursor is on the solution. **Intersection** and the *x*- and *y*-coordinates of the intersection is displayed in the bottom-left corner.





Solve.

1. $\begin{cases} y = x + 1 \\ y = -2x \end{cases}$
(0.33, 0.67)

2. $\begin{cases} y = -x - 2 \\ y = x + 2 \end{cases}$
(2, 0)

3. $\begin{cases} y = 2x + 1 \\ y = -3x - 5 \end{cases}$
(–1.2, –1.4)

4. $\begin{cases} y = 9 - 2x \\ y = \frac{1}{3}x - 5 \end{cases}$
(6, –3)

5. $\begin{cases} y = x + 4 \\ y = 9x \end{cases}$
(0.5, 4.5)

6. $\begin{cases} x = y + 7 \\ y = 5 - x \end{cases}$
(6, –1)

Possible Journal Response *(continued)*

3. **No, a system of equations cannot have exactly two solutions. If there are two solutions to a system, an infinite number of solutions will exist. A system of equations could have no solution, exactly one solution, or an infinite number of solutions.**
4. **A line can be graphed from an equation $Ax + By = C$ in one of two ways. First, the standard form could be rearranged in slope-intercept form before graphing; or, secondly, the line could be graphed directly from standard form using $\left(\frac{-A}{B}\right)$ as the slope and $\frac{C}{B}$ as the *y*-intercept without having to rearrange the equation.**
5. **Both points satisfy each equation, so both Patti and Daniel are right. The lines coincide, and the system has an infinite number of solutions, two of which are (2, 3) and (–1, –9).**