

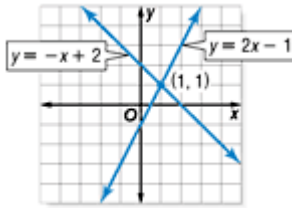
Lesson 8-9

Example 1 Solve by Graphing

Solve the system of equations by graphing.

$$y = 2x - 1$$

$$y = -x + 2$$



The graphs appear to intersect at the point (1, 1). Check this solution by substituting the coordinates into each equation.

CHECK

$$y = 2x - 1$$

$$1 \stackrel{?}{=} 2(1) - 1$$

$$1 = 1 \quad \checkmark$$

Write the equation.

Replace x with 1 and y with 1.

This is a true statement.

$$y = -x + 2$$

$$1 \stackrel{?}{=} -1 + 2$$

$$1 = 1 \quad \checkmark$$

Write the equation.

Replace x with 1 and y with 1.

This is a true statement.

The solution of the system of equations is (1, 1).

Example 2 One Solution

Cellular Phones A cellular phone provider offers two different plans. Plan A has a \$20 monthly charge plus \$0.10 per minute used. Plan B has a \$35 monthly charge plus \$0.05 per minute used.

- a. How many minutes would need to be used for the plans to have the same monthly cost?

Explore You know the monthly cost and the cost per minute used.

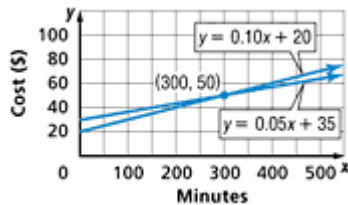
Plan Write an equation to represent each plan, and then graph the equations to find the solution.

Solve Let x = number of minutes used and let y = total monthly cost.

Total cost = cost for minutes used + monthly charge

Plan A $y = 0.10x + 20$

Plan B $y = 0.05x + 35$



The graph of the system shows the solution is (300, 50). This means that if 300 minutes are used, the cost of either plan will be \$50.

Examine Check by substituting (300, 50) into both equations in the system.

- b. Which plan would cost less if 125 minutes are used during the month?

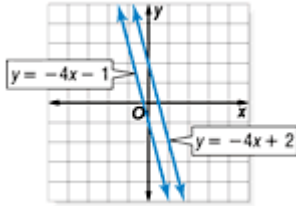
For $x = 125$, the line representing Plan A has a smaller y value. So, Plan A would cost less.

Example 3 No Solution

Solve the system of equations by graphing.

$$y = -4x + 2$$

$$y = -4x - 1$$



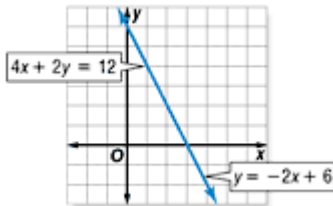
The graphs appear to be parallel lines. Since there is no coordinate pair that is a solution to both equations, there is no solution of this system of equations.

Example 4 Infinitely Many Solutions

Solve the system of equations by graphing.

$$4x + 2y = 12$$

$$y = -2x + 6$$



Both equations have the same graph. Any ordered pair on the graph will satisfy both equations. Therefore, there are infinitely many solutions of this system of equations.

Example 5 Solve By Substitution**Solve the system of equations by substitution.**

$$y = x - 3$$

$$y = -4$$

Since y must have the same value in both equations, you can replace y with -4 in the first equation.

$$y = x - 3$$

Write the first equation.

$$-4 = x - 3$$

Replace y with -4 .

$$-1 = x$$

Solve for x .

The solution of this system of equations is $(-1, -4)$. You can check the solution by graphing. The graphs appear to intersect at $(-1, -4)$, so the solution is correct.

