

## Vocabulary

consistent system.....	406	solution of a system of linear equations.....	383
dependent system.....	407	solution of a system of linear inequalities.....	421
inconsistent system.....	406	system of linear equations.....	383
independent system.....	407	system of linear inequalities.....	421
linear inequality.....	414		
solution of a linear inequality.....	414		

Complete the sentences below with vocabulary words from the list above.

1. A(n)     ? is a system that has exactly one solution.
2. A set of two or more linear equations that contain the same variable(s) is a(n)     ?.
3. The     ? consists of all the ordered pairs that satisfy all the inequalities in the system.
4. A system consisting of equations of parallel lines with different  $y$ -intercepts is a(n)     ?.
5. A(n)     ? consists of two intersecting lines.

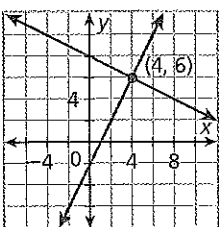
## 6-1 Solving Systems by Graphing (pp. 383–388)

### EXAMPLE

- Solve  $\begin{cases} y = 2x - 2 \\ x + 2y = 16 \end{cases}$  by graphing.

Check your answer.

$$\begin{cases} y = 2x - 2 \\ y = -\frac{1}{2}x + 8 \end{cases} \quad \text{Write the second equation in slope-intercept form.}$$



The solution appears to be at (4, 6).

$$\begin{array}{r|l} y = 2x - 2 & x + 2y = 16 \\ 6 & 2(4) - 2 \\ 6 & 6 \checkmark \end{array} \quad \begin{array}{r|l} & x + 2y = 16 \\ 4 + 2(6) & 16 \\ 16 & 16 \checkmark \end{array}$$

The ordered pair (4, 6) makes both equations true, so it is a solution of the system.

### EXERCISES

Tell whether the ordered pair is a solution of the given system.

6.  $(0, -5)$ ;  $\begin{cases} y = -6x + 5 \\ x - y = 5 \end{cases}$
7.  $(4, 3)$ ;  $\begin{cases} x - 2y = -2 \\ y = \frac{1}{2}x + 1 \end{cases}$
8.  $(1\frac{3}{4}, 7\frac{1}{4})$ ;  $\begin{cases} x + y = 9 \\ 2y = 6x + 4 \end{cases}$
9.  $(-1, -1)$ ;  $\begin{cases} y = -2x + 5 \\ 3y = 6x + 3 \end{cases}$

Solve each system by graphing. Check your answer.

10.  $\begin{cases} y = 3x + 2 \\ y = -2x - 3 \end{cases}$
11.  $\begin{cases} y = -\frac{1}{3}x + 5 \\ 2x - 2y = -2 \end{cases}$

12. Raheel is comparing the cost of two parking garages. Garage A charges a flat fee of \$6 per car plus \$0.50 per hour. Garage B charges a flat fee of \$2 per car plus \$1 per hour. After how many hours will the cost at garage A be the same as the cost at garage B? What will that cost be?

## 6-2 Solving Systems by Substitution (pp. 390–396)

### EXAMPLE

■ Solve  $\begin{cases} 2x - 3y = -2 \\ y - 3x = 10 \end{cases}$  by substitution.

Step 1  $y - 3x = 10$  Solve the second equation for  $y$ .  
 $y = 3x + 10$

Step 2  $2x - 3y = -2$  Substitute  $3x + 10$  for  $y$  in the first equation.  
 $2x - 3(3x + 10) = -2$

Step 3  $2x - 9x - 30 = -2$  Solve for  $x$ .  
 $-7x - 30 = -2$   
 $-7x = 28$   
 $x = -4$

Step 4  $y - 3x = 10$  Substitute  $-4$  for  $x$ .  
 $y - 3(-4) = 10$   
 $y + 12 = 10$  Find the value of  $y$ .  
 $y = -2$

Step 5  $(-4, -2)$  Write the solution as an ordered pair.

To check the solution, substitute  $(-4, -2)$  into both equations in the system.

### EXERCISES

Solve each system by substitution.

13.  $\begin{cases} y = x + 3 \\ y = 2x + 12 \end{cases}$

14.  $\begin{cases} y = -4x \\ y = 2x - 3 \end{cases}$

15.  $\begin{cases} 2x + y = 4 \\ 3x + y = 3 \end{cases}$

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

17.  $\begin{cases} x = y - 7 \\ -y - 2x = 8 \end{cases}$

18.  $\begin{cases} \frac{1}{2}x + y = 9 \\ 3x - 4y = -6 \end{cases}$

19. The Nash family's car needs repairs. Estimates for parts and labor from two garages are shown below.

Garage	Parts (\$)	Labor (\$ per hour)
Motor Works	650	70
Jim's Car Care	800	55

For how many hours of labor will the total cost of fixing the car be the same at both garages? What will that cost be? Which garage will be cheaper if the repairs require 8 hours of labor? Explain.

## 6-3 Solving Systems by Elimination (pp. 397–403)

### EXAMPLE

■ Solve  $\begin{cases} 2x - 3y = -8 \\ x + 4y = 7 \end{cases}$  by elimination.

Step 1  $\begin{array}{r} 2x - 3y = -8 \\ +(-2)(x + 4y = 7) \\ \hline \rightarrow 2x - 3y = -8 \\ +(-2x - 8y = -14) \end{array}$  Multiply the second equation by  $-2$ .  
 Eliminate the  $x$ -term.

Step 2  $0x - 11y = -22$  Solve for  $y$ .  
 $y = 2$

Step 3  $2x - 3y = -8$  Substitute 2 for  $y$ .  
 $2x - 3(2) = -8$  Simplify and solve for  $x$ .  
 $2x - 6 = -8$   
 $2x = -2$   
 $x = -1$

Step 4  $(-1, 2)$  Write the solution as an ordered pair.

To check the solution, substitute  $(-1, 2)$  into both equations in the system.

### EXERCISES

Solve each system by elimination.

20.  $\begin{cases} 4x + y = -1 \\ 2x - y = -5 \end{cases}$

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

22.  $\begin{cases} x + y = 12 \\ 2x + 5y = 27 \end{cases}$

23.  $\begin{cases} 3x - 2y = -6 \\ \frac{1}{3}x + 3y = 9 \end{cases}$

Solve each system by any method. Explain why you chose each method. Check your answer.

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

25.  $\begin{cases} y = \frac{1}{3}x - 6 \\ y = -2x + 1 \end{cases}$

26.  $\begin{cases} 2y = -3x \\ y = -2x + 2 \end{cases}$

27.  $\begin{cases} x - y = 0 \\ 3x + y = 8 \end{cases}$