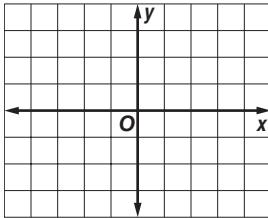


3-1 Skills Practice

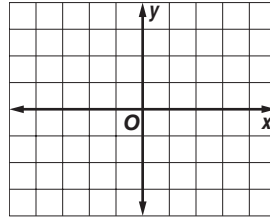
Solving Systems of Equations By Graphing

Solve each system of equations by graphing.

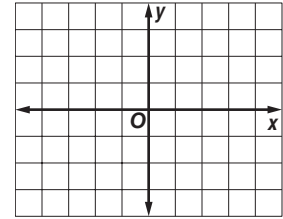
1. $x = 2$
 $y = 0$



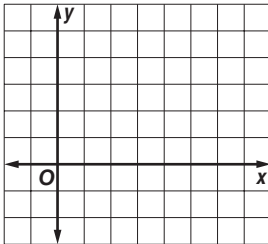
2. $y = -3x + 6$
 $y = 2x - 4$



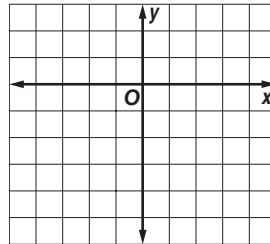
3. $y = 4 - 3x$
 $y = -\frac{1}{2}x - 1$



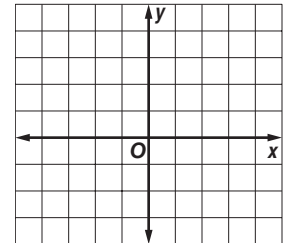
4. $y = 4 - x$
 $y = x - 2$



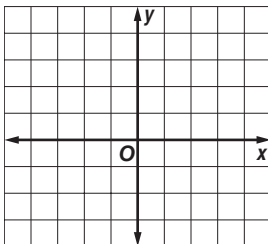
5. $y = -2x + 2$
 $y = \frac{1}{3}x - 5$



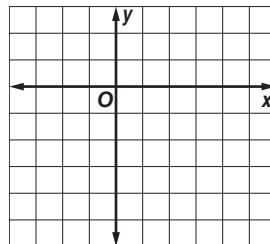
6. $y = x$
 $y = -3x + 4$



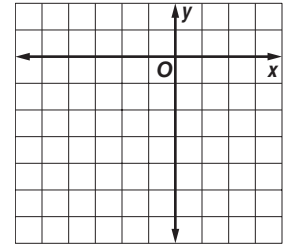
7. $x + y = 3$
 $x - y = 1$



8. $x - y = 4$
 $2x - 5y = 8$

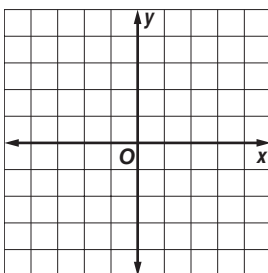


9. $3x - 2y = 4$
 $2x - y = 1$

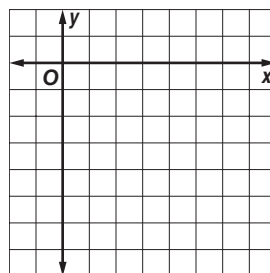


Graph each system of equations and describe it as *consistent and independent*, *consistent and dependent*, or *inconsistent*.

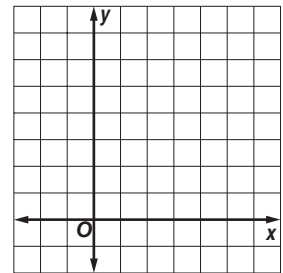
10. $y = -3x$
 $y = -3x + 2$



11. $y = x - 5$
 $-2x + 2y = -10$



12. $2x - 5y = 10$
 $3x + y = 15$

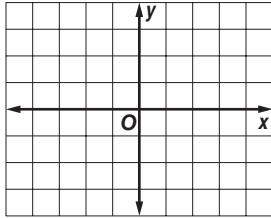


3-1 Practice

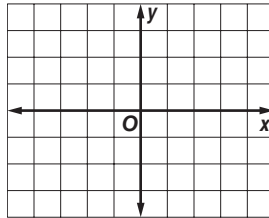
Solving Systems of Equations By Graphing

Solve each system of equations by graphing.

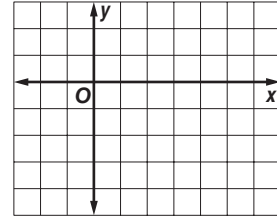
1. $x - 2y = 0$
 $y = 2x - 3$



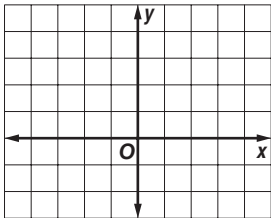
2. $x + 2y = 4$
 $2x - 3y = 1$



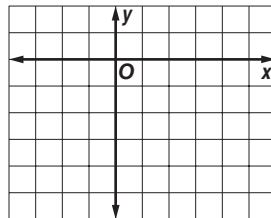
3. $2x + y = 3$
 $y = \frac{1}{2}x - \frac{9}{2}$



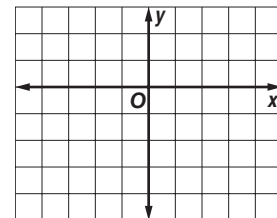
4. $y - x = 3$
 $y = 1$



5. $2x - y = 6$
 $x + 2y = -2$

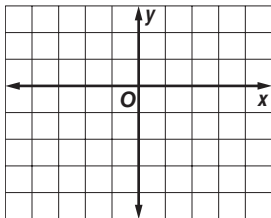


6. $5x - y = 4$
 $-2x + 6y = 4$

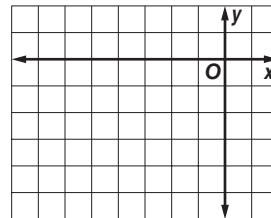


Graph each system of equations and describe it as *consistent and independent*, *consistent and dependent*, or *inconsistent*.

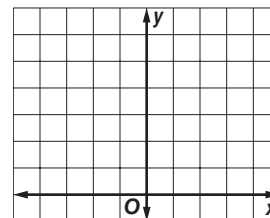
7. $2x - y = 4$
 $x - y = 2$



8. $y = -x - 2$
 $x + y = -4$



9. $2y - 8 = x$
 $y = \frac{1}{2}x + 4$

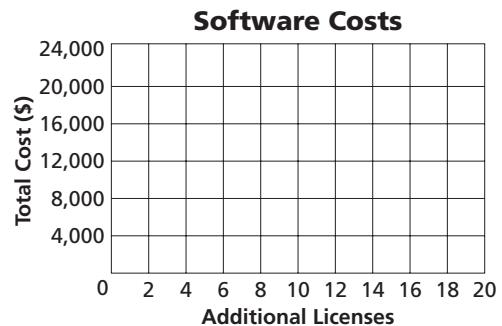


10. SOFTWARE Location Mapping needs new software. Software A costs \$13,000 plus \$500 per additional site license. Software B costs \$2500 plus \$1200 per additional site license.

a. Write two equations that represent the cost of each software.

b. Graph the equations. Estimate the break-even point of the software costs.

c. If Location Mapping plans to buy 10 additional site licenses, which software will cost less?



3-2 Skills Practice**Solving Systems of Equations Algebraically**

Solve each system of equations by using substitution.

1. $a + b = 20$
 $a - b = -4$

2. $x + 3y = -3$
 $4x + 3y = 6$

3. $w - z = 1$
 $2w + 3z = 12$

4. $3r + t = 5$
 $2r - t = 5$

5. $2b + 3c = -4$
 $b + c = 3$

6. $x - y = -5$
 $3x + 4y = 13$

Solve each system of equations by using elimination.

7. $2t - u = 17$
 $3t + u = 8$

8. $2j - k = 3$
 $3j + k = 2$

9. $3c - 2d = 2$
 $3c + 4d = 50$

10. $2f + 3g = 9$
 $f - g = 2$

11. $-2x + y = -1$
 $x + 2y = 3$

12. $2x - y = 12$
 $2x - y = 6$

Solve each system of equations.

13. $-r + t = 5$
 $-2r + t = 4$

14. $2x - y = -5$
 $4x + y = 2$

15. $x - 3y = -12$
 $2x + y = 11$

16. $2p - 3r = 6$
 $-2p + 3r = -6$

17. $6w - 8z = 16$
 $3w - 4z = 8$

18. $c + d = 6$
 $c - d = 0$

19. $2u + 4x = -6$
 $u + 2x = 3$

20. $3a + b = -1$
 $-3a + b = 5$

21. $2x + y = 6$
 $3x - 2y = 16$

22. $3y - z = -6$
 $-3y - z = 6$

23. $c + 2d = -2$
 $-2c - 5d = 3$

24. $3r - 2t = 1$
 $2r - 3t = 9$

25. The sum of two numbers is 12. The difference of the same two numbers is -4 . Find the numbers.26. Twice a number minus a second number is -1 . Twice the second number added to three times the first number is 9. Find the two numbers.

3-2 Practice**Solving Systems of Equations Algebraically**

Solve each system of equations by using substitution.

1. $2x + y = 4$
 $3x + 2y = 1$

2. $x - 3y = 9$
 $x + 2y = -1$

3. $g + 3h = 8$
 $\frac{1}{3}g + h = 9$

4. $2a - 4b = 6$
 $-a + 2b = -3$

5. $2m + n = 6$
 $5m + 6n = 1$

6. $4x - 3y = -6$
 $-x - 2y = 7$

7. $u - 2v = \frac{1}{2}$
 $-u + 2v = 5$

8. $x - 3y = 16$
 $4x - y = 9$

9. $w + 3z = 1$
 $3w - 5z = -4$

Solve each system of equations by using elimination.

10. $2r + s = 5$
 $3r - s = 20$

11. $2m - n = -1$
 $3m + 2n = 30$

12. $6x + 3y = 6$
 $8x + 5y = 12$

13. $3j - k = 10$
 $4j - k = 16$

14. $2x - y = -4$
 $-4x + 2y = 6$

15. $2g + h = 6$
 $3g - 2h = 16$

16. $2t + 4v = 6$
 $-t - 2v = -3$

17. $3x - 2y = 12$
 $2x + \frac{2}{3}y = 14$

18. $\frac{1}{2}x + 3y = 11$
 $8x - 5y = 17$

Solve each system of equations.

19. $8x + 3y = -5$
 $10x + 6y = -13$

20. $8q - 15r = -40$
 $4q + 2r = 56$

21. $3x - 4y = 12$
 $\frac{1}{3}x - \frac{4}{9}y = \frac{4}{3}$

22. $4b - 2d = 5$
 $-2b + d = 1$

23. $s + 3y = 4$
 $s = 1$

24. $4m - 2p = 0$
 $-3m + 9p = 5$

25. $5g + 4k = 10$
 $-3g - 5k = 7$

26. $0.5x + 2y = 5$
 $x - 2y = -8$

27. $h - z = 3$
 $-3h + 3z = 6$

28. SPORTS Last year the volleyball team paid \$5 per pair for socks and \$17 per pair for shorts on a total purchase of \$315. This year they spent \$342 to buy the same number of pairs of socks and shorts because the socks now cost \$6 a pair and the shorts cost \$18.

a. Write a system of two equations that represents the number of pairs of socks and shorts bought each year.

b. How many pairs of socks and shorts did the team buy each year?

3-5 Skills Practice**Systems of Equations in Three Variables**

Solve each system of equations.

1. $2a + c = -10$

$b - c = 15$

$a - 2b + c = -5$

2. $x + y + z = 3$

$13x + 2z = 2$

$-x - 5z = -5$

3. $2x + 5y + 2z = 6$

$5x - 7y = -29$

$z = 1$

4. $x + 4y - z = 1$

$3x - y + 8z = 0$

$x + 4y - z = 10$

5. $-2z = -6$

$2x + 3y - z = -2$

$x + 2y + 3z = 9$

6. $3x - 2y + 2z = -2$

$x + 6y - 2z = -2$

$x + 2y = 0$

7. $-x - 5z = -5$

$y - 3x = 0$

$13x + 2z = 2$

8. $-3x + 2z = 1$

$4x + y - 2z = -6$

$x + y + 4z = 3$

9. $x - y + 3z = 3$

$-2x + 2y - 6z = 6$

$y - 5z = -3$

10. $5\ell + 3n + p = 4$

$3\ell + 2n = 0$

$2\ell - n + 3p = 8$

11. $2x + 2y + 2z = -2$

$2x + 3y + 2z = 4$

$x + y + z = -1$

12. $x + 2y - z = 4$

$3x - y + 2z = 3$

$-x + 3y + z = 6$

13. $3x - 2y + z = 1$

$-x + y - z = 2$

$5x + 2y + 10z = 39$

14. $3x - 5y + 2z = -12$

$x + 4y - 2z = 8$

$-3x + 5y - 2z = 12$

15. $2x + y + 3z = -2$

$x - y - z = -3$

$3x - 2y + 3z = -12$

16. $2x - 4y + 3z = 0$

$x - 2y - 5z = 13$

$5x + 3y - 2z = 19$

17. $-2x + y + 2z = 2$

$3x + 3y + z = 0$

$x + y + z = 2$

18. $x - 2y + 2z = -1$

$x + 2y - z = 6$

$-3x + 6y - 6z = 3$

19. The sum of three numbers is 18. The sum of the first and second numbers is 15, and the first number is 3 times the third number. Find the numbers.

3-5 Practice**Systems of Equations in Three Variables**

Solve each system of equations.

$$\begin{aligned} 1. \quad & 2x - y + 2z = 15 \\ & -x + y + z = 3 \\ & 3x - y + 2z = 18 \end{aligned}$$

$$\begin{aligned} 2. \quad & x - 4y + 3z = -27 \\ & 2x + 2y - 3z = 22 \\ & 4z = -16 \end{aligned}$$

$$\begin{aligned} 3. \quad & a + b = 3 \\ & -b + c = 3 \\ & a + 2c = 10 \end{aligned}$$

$$\begin{aligned} 4. \quad & 3m - 2n + 4p = 15 \\ & m - n + p = 3 \\ & m + 4n - 5p = 0 \end{aligned}$$

$$\begin{aligned} 5. \quad & 2g + 3h - 8j = 10 \\ & g - 4h = 1 \\ & -2g - 3h + 8j = 5 \end{aligned}$$

$$\begin{aligned} 6. \quad & 2x + y - z = -8 \\ & 4x - y + 2z = -3 \\ & -3x + y + 2z = 5 \end{aligned}$$

$$\begin{aligned} 7. \quad & 2x - 5y + z = 5 \\ & 3x + 2y - z = 17 \\ & 4x - 3y + 2z = 17 \end{aligned}$$

$$\begin{aligned} 8. \quad & 2x + 3y + 4z = 2 \\ & 5x - 2y + 3z = 0 \\ & x - 5y - 2z = -4 \end{aligned}$$

$$\begin{aligned} 9. \quad & p + 4r = -7 \\ & p - 3q = -8 \\ & q + r = 1 \end{aligned}$$

$$\begin{aligned} 10. \quad & 4x + 4y - 2z = 8 \\ & 3x - 5y + 3z = 0 \\ & 2x + 2y - z = 4 \end{aligned}$$

$$\begin{aligned} 11. \quad & d + 3e + f = 0 \\ & -d + 2e + f = -1 \\ & 4d + e - f = 1 \end{aligned}$$

$$\begin{aligned} 12. \quad & 4x + y + 5z = -9 \\ & x - 4y - 2z = -2 \\ & 2x + 3y - 2z = 21 \end{aligned}$$

$$\begin{aligned} 13. \quad & 5x + 9y + z = 20 \\ & 2x - y - z = -21 \\ & 5x + 2y + 2z = -21 \end{aligned}$$

$$\begin{aligned} 14. \quad & 2x + y - 3z = -3 \\ & 3x + 2y + 4z = 5 \\ & -6x - 3y + 9z = 9 \end{aligned}$$

$$\begin{aligned} 15. \quad & 3x + 3y + z = 10 \\ & 5x + 2y + 2z = 7 \\ & 3x - 2y + 3z = -9 \end{aligned}$$

$$\begin{aligned} 16. \quad & 2u + v + w = 2 \\ & -3u + 2v + 3w = 7 \\ & -u - v + 2w = 7 \end{aligned}$$

$$\begin{aligned} 17. \quad & x + 5y - 3z = -18 \\ & 3x - 2y + 5z = 22 \\ & -2x - 3y + 8z = 28 \end{aligned}$$

$$\begin{aligned} 18. \quad & x - 2y + z = -1 \\ & -x + 2y - z = 6 \\ & -4y + 2z = 1 \end{aligned}$$

$$\begin{aligned} 19. \quad & 2x - 2y - 4z = -2 \\ & 3x - 3y - 6z = -3 \\ & -2x + 3y + z = 7 \end{aligned}$$

$$\begin{aligned} 20. \quad & x - y + 9z = -27 \\ & 2x - 4y - z = -1 \\ & 3x + 6y - 3z = 27 \end{aligned}$$

$$\begin{aligned} 21. \quad & 2x - 5y - 3z = 7 \\ & -4x + 10y + 2z = 6 \\ & 6x - 15y - z = -19 \end{aligned}$$

22. The sum of three numbers is 6. The third number is the sum of the first and second numbers. The first number is one more than the third number. Find the numbers.

23. The sum of three numbers is -4 . The second number decreased by the third is equal to the first. The sum of the first and second numbers is -5 . Find the numbers.

24. **SPORTS** Alexandria High School scored 37 points in a football game. Six points are awarded for each touchdown. After each touchdown, the team can earn one point for the extra kick or two points for a 2-point conversion. The team scored one fewer 2-point conversions than extra kicks. The team scored 10 times during the game. How many touchdowns were made during the game?

Systems of Equations Word Problems

- 1) Find the value of two numbers if their sum is 12 and their difference is 4.
- 2) The difference of two numbers is 3. Their sum is 13. Find the numbers.
- 3) Flying to Kampala with a tailwind a plane averaged 158 km/h. On the return trip the plane only averaged 112 km/h while flying back into the same wind. Find the speed of the wind and the speed of the plane in still air.
- 4) The school that Stefan goes to is selling tickets to a choral performance. On the first day of ticket sales the school sold 3 senior citizen tickets and 1 child ticket for a total of \$38. The school took in \$52 on the second day by selling 3 senior citizen tickets and 2 child tickets. Find the price of a senior citizen ticket and the price of a child ticket.
- 5) The sum of the digits of a certain two-digit number is 7. Reversing its digits increases the number by 9. What is the number?
- 6) A boat traveled 210 miles downstream and back. The trip downstream took 10 hours. The trip back took 70 hours. What is the speed of the boat in still water? What is the speed of the current?

- 7) The state fair is a popular field trip destination. This year the senior class at High School A and the senior class at High School B both planned trips there. The senior class at High School A rented and filled 8 vans and 8 buses with 240 students. High School B rented and filled 4 vans and 1 bus with 54 students. Every van had the same number of students in it as did the buses. Find the number of students in each van and in each bus.
- 8) The senior classes at High School A and High School B planned separate trips to New York City. The senior class at High School A rented and filled 1 van and 6 buses with 372 students. High School B rented and filled 4 vans and 12 buses with 780 students. Each van and each bus carried the same number of students. How many students can a van carry? How many students can a bus carry?
- 9) Brenda's school is selling tickets to a spring musical. On the first day of ticket sales the school sold 3 senior citizen tickets and 9 child tickets for a total of \$75. The school took in \$67 on the second day by selling 8 senior citizen tickets and 5 child tickets. What is the price each of one senior citizen ticket and one child ticket?
- 10) 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.
- 11) A boat traveled 336 miles downstream and back. The trip downstream took 12 hours. The trip back took 14 hours. What is the speed of the boat in still water? What is the speed of the current?