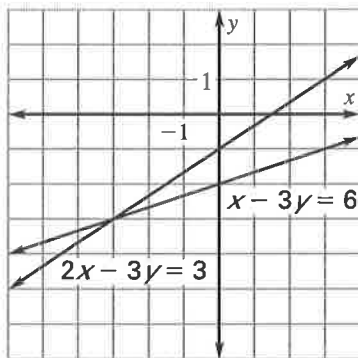


Answers for 7.1

For use with pages 430–433

7.1 Skill Practice

1. solution
2. *Sample answer:* Graph both equations and then estimate the point at which the graphs intersect. Then check whether the point is a solution of each equation.
3. solution 4. not a solution
5. not a solution 6. B
7. B 8. (1, -3)
9. (4, 2) 10. (3, 2)
11. The solution (3, -1) does not satisfy Equation 2. The graph of Equation 2 is incorrect; if properly graphed, the lines would intersect at (-3, -3).



12. (1, 2) 13. (4, 0)
14. (-2, -2) 15. (-3, -5)
16. (1.8, -0.4) 17. (10, -15)

18. (4, 3) 19. (7, -5)
20. (1, -2) 21. (-5, 2)
22. (3, 3) 23. (3, 6)
24. (8, 2) 25. (4, 6)
26. (5, 5)
27. *Sample answer:* $m = 0$ and $b = 2$
28. (0.5, 0.5). *Sample answer:* It is important to check the solution because the lines do not intersect at integer values.
29. a. 4 b. 4
- c. *Sample answer:* Each side of the equation is set equal to y .
- d. *Sample answer:* Set each side of the equation equal to y to create a system of two equations. Then solve the system using the graph-and-check method.
30. (3, 5), (1, 2), and (5, 1)

7.1 Problem Solving

31. 2040
32. B
33. 15 small cards and 10 large cards

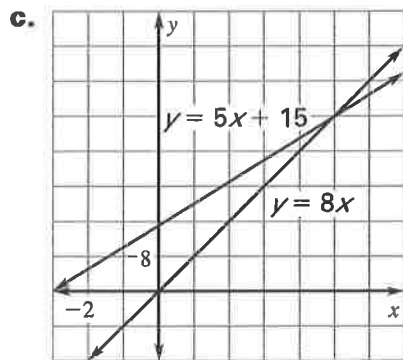
Answers for 7.1 *continued*
For use with pages 430–433

- 34. a.** 25 minutes on the stationary bike and 15 minutes on the stair machine
b. 25 minutes on the elliptical trainer and 5 minutes on the stair machine

35. a. $y = 5x + 15$, $y = 8x$

b.

| Tickets | Cost for members | Cost for non-members |
|---------|------------------|----------------------|
| 1 | \$20 | \$8 |
| 2 | \$25 | \$16 |
| 3 | \$30 | \$24 |
| 4 | \$35 | \$32 |
| 5 | \$40 | \$40 |
| 6 | \$45 | \$48 |



When you rent 6 or more movies. *Sample answer:* The graph for a non-member is below the graph for a

member up through 4 movies. For 5 movies, the cost is the same. The graph for members is lower than the graph for non-members for 6 or more movies.

- 36.** You should choose \$25 off if your purchase is less than \$125, and choose 20% off purchases greater than \$125. *Sample answer:* For values less than \$125, 20% off is less than \$25 off. For values greater than \$125, 20% off is greater than \$25 off.

7.1 Mixed Review

- 37.** -19 **38.** -3 **39.** -4
40. 6 **41.** -2.5 **42.** $-\frac{11}{3}$
43. $y = \frac{3}{5}x - 5$
44. $y = 7x - 9$
45. $y = 4x - 11$
46. $y = -\frac{4}{3}x + 1$
47. $y = -2x - 7$
48. $y = -\frac{1}{2}x - 6$

Answers for 7.2

For use with pages 439–441

7.2 Skill Practice

- $y = x + 1, y = 2x + 1$
- Sample answer:* Solve Equation 2 for y ; the y term does not have a coefficient.
- (5, 3)
- (1, 1)
- (2, -1)
- (13, 6)
- (-4, 5)
- (3, 22)
- (6, 7)
- (8, -7)
- (2, -2)
- (-1, 11)
- (5, -8)
- (4, 3)
- (0, 2)
- (-1, 1)
- (1.4, -4.4)
- A
- Sample answer:* In Step 3, 6 is substituted for y instead of x ; $y = 9 - 3(6), y = -9$, the solution is (6, -9).
- (5, 1)
- (4, -120)
- (10.5, 11.75)
- (3, 7)
- (14, 10)
- (6, -3)
- $(5\frac{1}{2}, 9)$
- (0, -6)
- (12, 10)
- Sample answer:* The graphs of the equations should intersect at the solution you found using the substitution method.

30. $a = 4, b = 5$

7.2 Problem Solving

- 96 bags of popcorn; 48 pretzels
- 22 tubes for a person and 4 “cooler” tubes
- 4 in. *Sample answer:* (4, 5) is the solution to the appropriate linear system, so x should be equal to 4.
- a. 21.6 sec
b. Yes. *Sample answer:* After 21.6 seconds they have swam 41.04 meters, so the race is not over.
- 50 milliliters of 1% hydrochloric acid solution and 50 milliliters of 5% hydrochloric acid solution
- 12 quarters
- Yes. *Sample answer:* The cheetah would have to run at 88 feet per second for 23.3 seconds to catch the gazelle.
- Yes. *Sample answer:* The gardener needs 4.8 bushels of the 50% peat moss and 50% vermiculite mix, and the gardener had 5 bushels.

7.2 Mixed Review

- | | | |
|--------|--------|-------|
| 39. 9 | 40. 27 | 41. 1 |
| 42. 21 | 43. -4 | 44. 8 |

Answers for 7.2 *continued*
For use with pages 439–441

45. $2x - 8y = 0, 4x - 16y = 0$

46. $x - 3y = -2, 3x - 9y = -6$

47. $7x + y = -1, -14x - 2y = 2$

48. $x - 2y = 1, -x + 2y = -1$

49. $-x - 6y = 4, x + 6y = -4$

50. $2x + 5y = -1, 12x + 30y = -6$

Answers for 7.3

For use with pages 447–450

7.3 Skill Practice

- Sample answer:* $x + y = 10$,
 $x - y = 5$
- Sample answer:* Subtract Equation 2 from Equation 1 then solve the resulting equation for y . Then substitute the value of y and solve for x .
- (1, 6)
- (-3, 29)
- (-1, -5)
- (12, 6)
- (5, 7)
- (-1, 2)
- (-1, 2)
- (-2, 2)
- (5, 3)
- (0, -10)
- (4, 5)
- (-3, 1)
- C
- (-15, -62)
- (2, -3)
- (-6, -1)
- (-18, 4)
- (5, 3)
- (4, -3)
- B
- Sample answer:* The two equations should be subtracted rather than added; $6x = 8$, $x = \frac{4}{3}$.
- Sample answer:* When $-3x$ is moved to the other side, it should become $3x$, the equations should then be subtracted;
 $3x - 2y = -3$, $3x + 5y = 60$,
 $-7y = -63$, $y = 9$.
- (26, 14)
- (4, -9)
- (-4, 12)
- (5, 8)
- (-2, 5)
- (-2, 0.125)
- (5, 25)
- (10, 6)
- (-2, 8)
- a. $2 = m + b$, $12 = -4m + b$
b. slope: -2 ; y -intercept: 4
c. $y = -2x + 4$
- $l = 4.5$ ft, $w = 2.5$ ft
- Sample answer:* First solve Equation 1 and 2 using elimination. Then check the solution for all three equations.
- (0, 2)
- Sample answer:* Subtract Equation 2 from Equation 1 to solve for y . Then substitute y into Equation 3 to solve for x . Then substitute x and y into Equation 1 or Equation 2 to solve for z . Check solution in all three equations.

Answers for 7.3 *continued*
For use with pages 447–450

7.3 Problem Solving

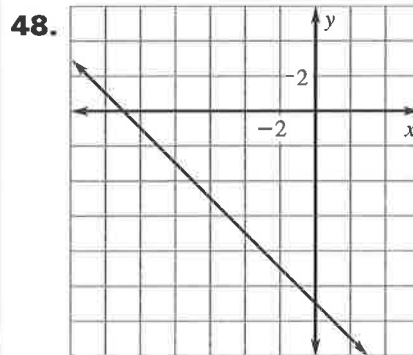
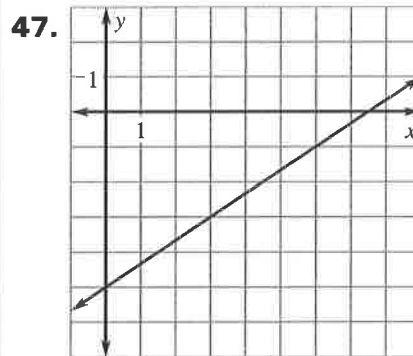
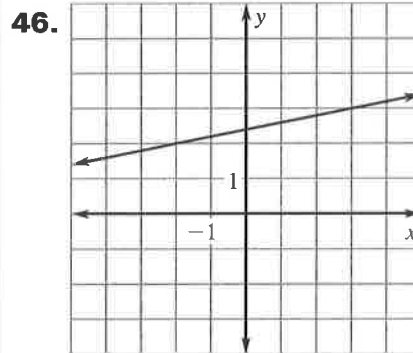
- 39.** speed in still water: 4.6 m/sec,
speed of current: 0.3 m/sec
- 40.** flat fee: \$14.95,
cost of oil: \$1.50/quart
- 41.** monophonic ring tone: \$1.95,
polyphonic ring tone: \$3.50
- 42. a.** Let x represent the number
of twigs and y represent the
number of flowers;
 $x + 3y = 15$, $x + y = 9$,
6 twigs and 3 flowers.

b.

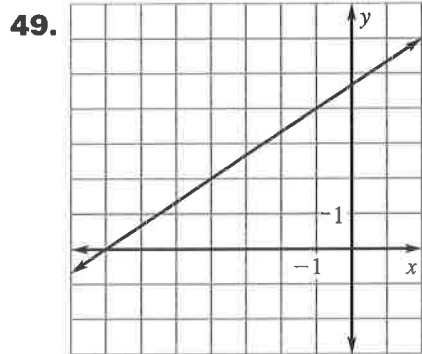
| Flowers | Twigs | Cost |
|---------|-------|------|
| 0 | 9 | \$9 |
| 1 | 8 | \$11 |
| 2 | 7 | \$13 |
| 3 | 6 | \$15 |
| 4 | 5 | \$17 |
| 5 | 4 | \$19 |

- 43. a.** flight to Phoenix: 400 mi/h,
flight to Charlotte: 450 mi/h
- b.** $s + w = 450$, $s - w = 400$;
plane: 425 mi/h, wind: 25 mi/h
- 44.** \$3248. *Sample answer:*
Each cap-and-gown costs \$14 and
each extra tassel costs \$3.50.
- 45.** ideal sleeve length: 63.5 cm,
allowable deviation: 1.3 cm

7.3 Mixed Review



Answers for 7.3 *continued*
For use with pages 447–450



50. $(2, -1)$ 51. $(6, 2)$

52. $(0, 6)$ 53. 36

54. 72 55. 60

Answers for 7.4

For use with pages 454–458

7.4 Skill Practice

1. 36
2. *Sample answer:* Multiply Equation 1 by 3 and add to Equation 2. Then solve for x and substitute to find y .
3. (1, 1) 4. (5, 6)
5. (5, -4) 6. (19, 16)
7. (2, 1) 8. (8, 3)
9. (-7, -12) 10. (-17, 5)
11. (5, 6) 12. (-6, 10)
13. (4, 4) 14. (1, 2)
15. (5, -3) 16. (7, 6)
17. $(4\frac{2}{7}, 5)$ 18. D
19. *Sample answer:* The two equations should be subtracted rather than added; $-x = -9$, $x = 9$.
20. *Sample answer:* The right side of the equations were not multiplied; $27x + 24y = 33$, $28x + 24y = 36$, $-x = -3$, $x = 3$.
21. (2, -1) 22. $(3\frac{4}{11}, -\frac{10}{11})$
23. $(-4\frac{5}{22}, -2\frac{1}{11})$
24. (-1, 2) 25. (5, 4)

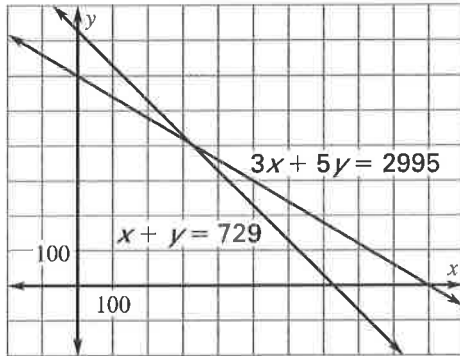
26. (-2, 7) 27. (10, 2)
28. (20, 10) 29. (2, -1)
30. (2, -2) 31. $(\frac{1}{3}, -\frac{2}{3})$
32. (10, 12)
33. a. $2l + 2w = 18$, $6l + 4w = 46$
b. length: 15 in., width: 8 in.
34. 4 and -4. *Sample answer:* For these values, you can add or subtract to eliminate the x term.
35. $a = 3$, $b = 4$
36. $a = 6$, $b = 8$

7.4 Problem Solving

37. 5 hardcover books
38. \$.99; \$9.99
39. 21 pies, 16 batches of applesauce
40. a. Let x represent the number of student tickets and y represent the number of adult tickets;
 $3x + 5y = 2995$, $x + y = 729$,
325 student tickets and 404 adult tickets.

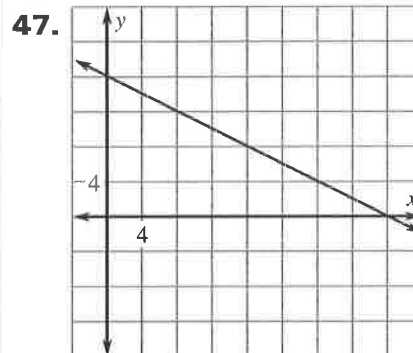
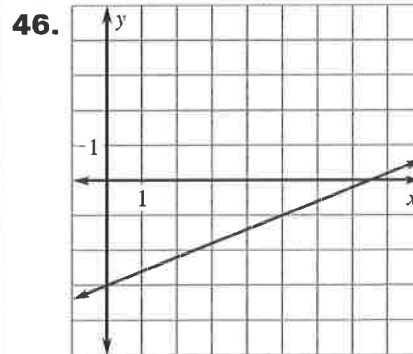
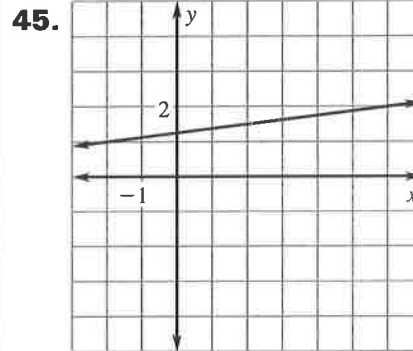
Answers for 7.4 *continued*
For use with pages 454–458

40. b.

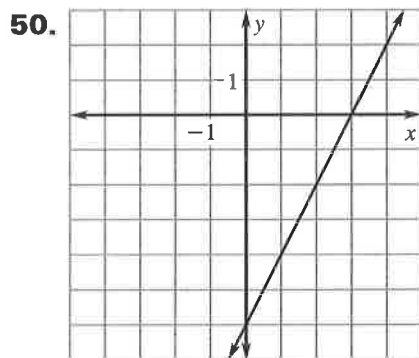
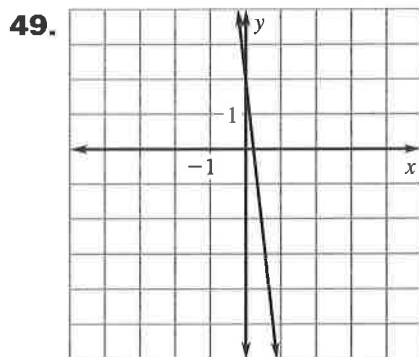
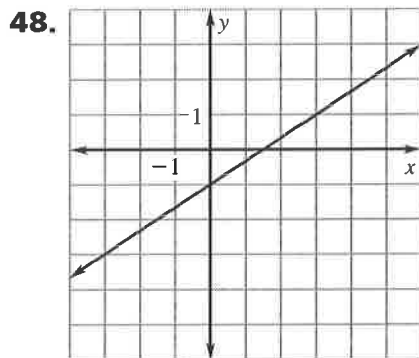


41. \$16.50; a small costs \$2.90, and a large costs \$3.90;
 $3(2.90) + 2(3.90) = 16.50$
42. *Sample answer:* Two cars are traveling on the same route. One car leaves 30 minutes before the other car and travels at a rate of 40 miles per hour. If the other car travels 45 miles per hour, how many hours will it take for the second car to catch the first car?
4 h, the second car will have to travel 4 hours in order to catch the first car.
43. \$800; \$1200
44. first leg: 60 mi/h,
second leg; 45 mi/h

7.4 Mixed Review



Answers for 7.4 *continued*
For use with pages 454–458



51. b and c 52. a and c
53. $(2, -1)$ 54. $(5, 10)$
55. $(-6, 3)$ 56. $(8, -3)$
57. $(-1, 1)$ 58. $(0.5, 1)$

7.1–7.4 Mixed Review of Problem Solving

1. a. first leg: 60 km/h,
second leg: 75 km/h
b. $r - w = 60, r + w = 75$
c. speed in still air: 67.5 km/h,
wind speed: 7.5 km/h
2. \$12. *Sample answer:* Potato salad costs \$3.25 per pound, and coleslaw costs \$2.75 per pound. So 2 pounds of each costs \$12.
3. 4 months;

| | | | |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| | | | 4 |
| | <input checked="" type="radio"/> | <input checked="" type="radio"/> | |
| <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> |
| | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | <input checked="" type="radio"/> |
| 5 | 5 | 5 | 5 |
| 6 | 6 | 6 | 6 |
| 7 | 7 | 7 | 7 |
| 8 | 8 | 8 | 8 |
| 9 | 9 | 9 | 9 |

Answers for 7.4 *continued*

For use with pages 454–458

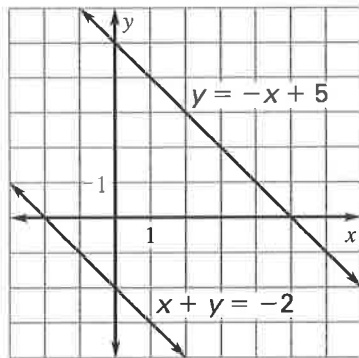
- 4.** *Sample answer:* You have \$75 to spend on 10 items. Small items cost \$5 each and large items cost \$10 each. How many of each item can you buy? Linear system:
 $5x + 10y = 75$, $x + y = 10$.
Solution: $x = 5$, $y = 5$. You can buy 5 small items and 5 large items for \$75.
- 5.** No. *Sample answer:*
After 30 minutes the balloon from Newman Park remains higher than the balloon from Kirby Park.
- 6. a.** $0.1x + 0.3y = 0.2 \cdot 500$,
 $x + y = 500$
- b.** 250 milliliters of 10% acid and 90% water mix, and 250 milliliters of the 30% acid and 70% water mix.
- c.** More of the 10% acid and 90% water mix.
Sample answer: Adding more of the 30% acid and 70% water mix would raise the percent of acid, not lower it.

Answers for 7.5

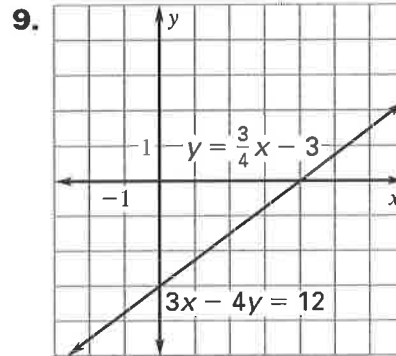
For use with pages 462–465

7.5 Skill Practice

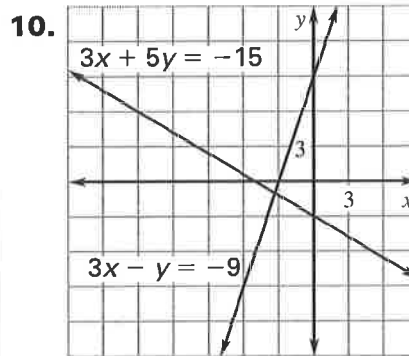
1. inconsistent system
2. consistent dependent system
3. *Sample answer:* The lines have the same slope but different intercepts.
4. *Sample answer:* The graph would show only one line.
5. B; one solution
6. C; no solution
7. A; infinitely many solutions
- 8.



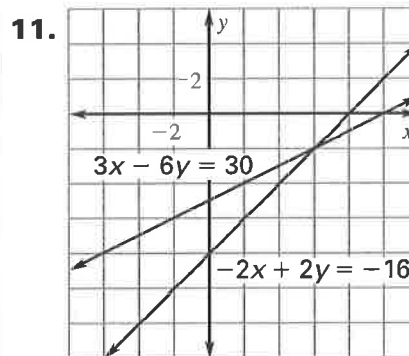
no solution



infinitely many solutions



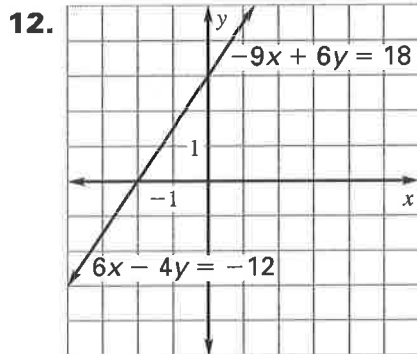
one solution



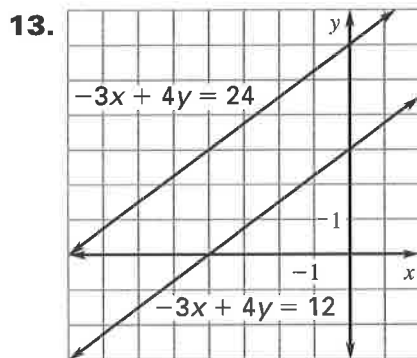
one solution

Answers for 7.5 *continued*

For use with pages 462–465

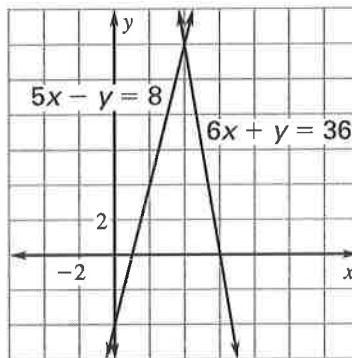


infinitely many solutions



no solution

- 14. Sample answer:** The lines do not have the same slope, so they are not parallel and they do have a solution. If the graph were larger the lines would intersect at (4, 12);



- 15.** $(-3, 4)$
- 16.** infinitely many solutions
- 17.** $(3, 7)$
- 18.** infinitely many solutions
- 19.** $(2, 2)$ **20.** no solution
- 21.** no solution **22.** $(3, 0)$
- 23.** $(0, 3)$ **24.** C
- 25.** D **26.** no solution
- 27.** infinitely many solutions
- 28.** one solution
- 29.** infinitely many solutions
- 30.** one solution
- 31.** infinitely many solutions
- 32. Sample answer:**
 $y = 3x + 2, 2y = 6x + 4$
- 33. Sample answer:**
 $7x - 8y = -9, 7x - 8y = 4$
- 34. Sample answer:** $y = 3x, 2y = 6x$

Answers for 7.5 *continued*
For use with pages 462–465

- 35. a.** *Sample answer:*
 $p = 2, q = -3, r = 0$
- b.** *Sample answer:*
 $p = 4, q = -6, r = 10$
- c.** *Sample answer:*
 $p = 1, q = 1, r = 5$

7.5 Problem Solving

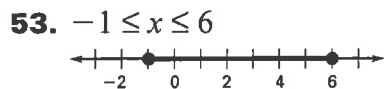
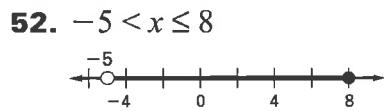
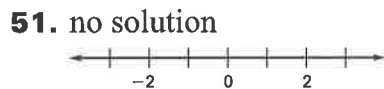
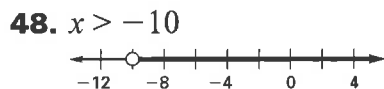
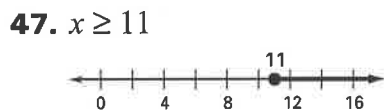
- 36.** No. *Sample answer:* There are infinitely many solutions to the resulting linear system.
- 37.** Yes. *Sample answer:* There is one solution to the resulting linear system.
- 38. a.** No. *Sample answer:* There are infinitely many solutions to the resulting linear system.
- b.** Yes. *Sample answer:* You can write a new equation and create a linear system that has only one solution.
- 39. a.** $d = \frac{t}{3}, d = \frac{t}{3} - 5$
- b.** *Sample answer:* No, since the lines are parallel, the two climbers will never be at the same distance at the same time.

- 40. a.** $y = 5x, y = 4(x - 10)$
- b.** $(-40, -200)$
- c.** No. *Sample answer:* x and y only make sense for positive values.

41. 540 miles

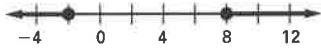
7.5 Mixed Review

- 42.** -6 **43.** 4
- 44.** -3 **45.** 8

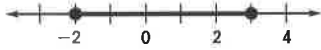


Answers for 7.5 *continued*
 For use with pages 462–465

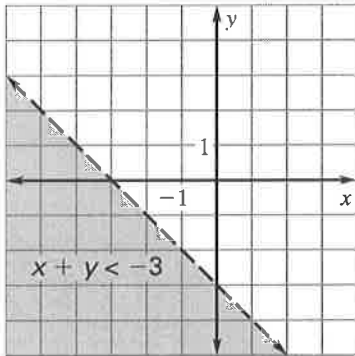
54. $x \leq -2$ or $x \geq 8$



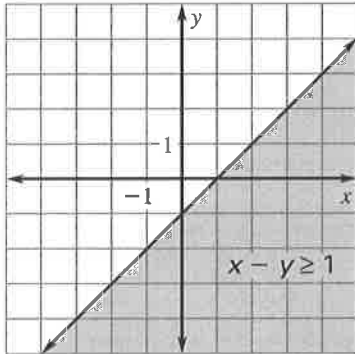
55. $-2 \leq x \leq 3$



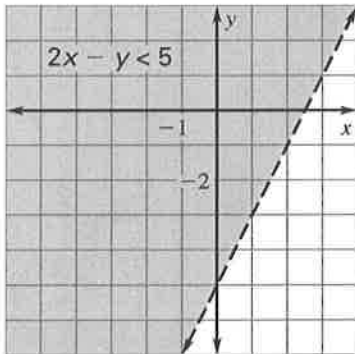
56.



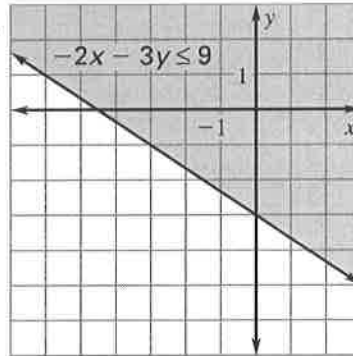
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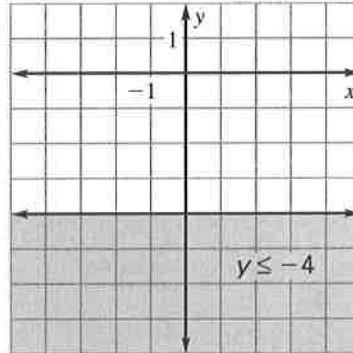
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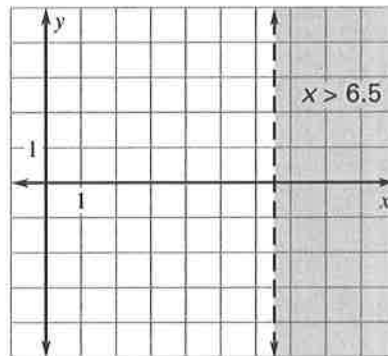
59.



60.



61.

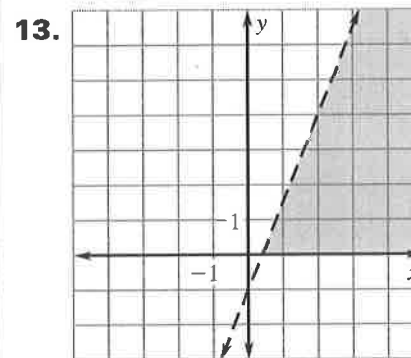
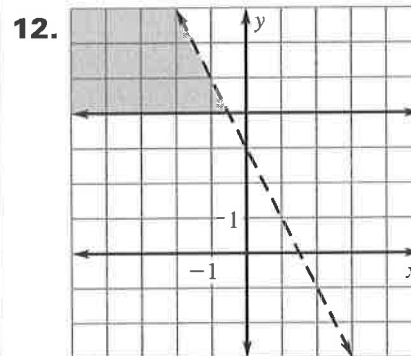
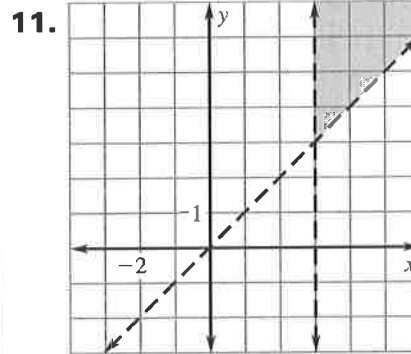
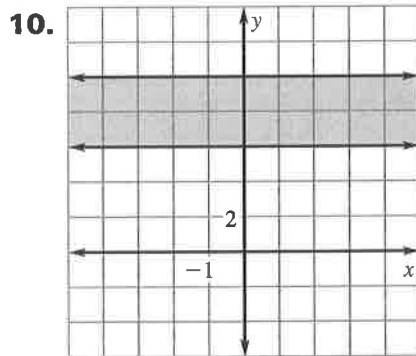
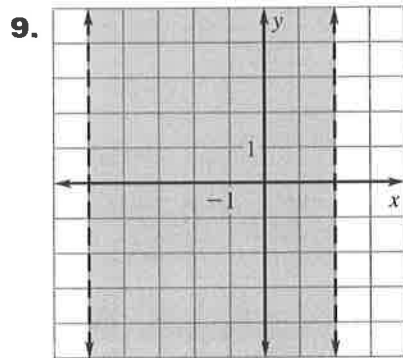


Answers for 7.6

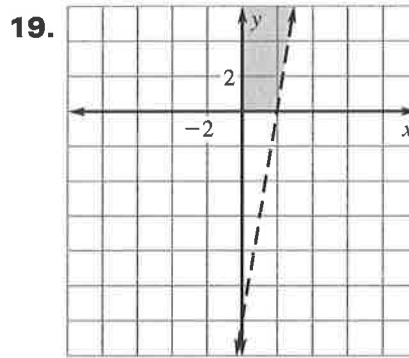
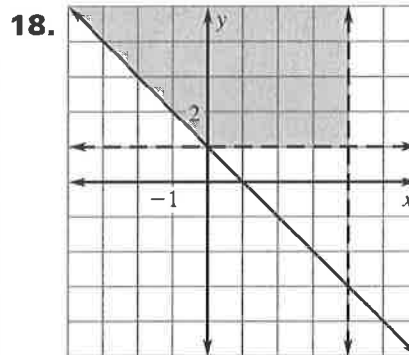
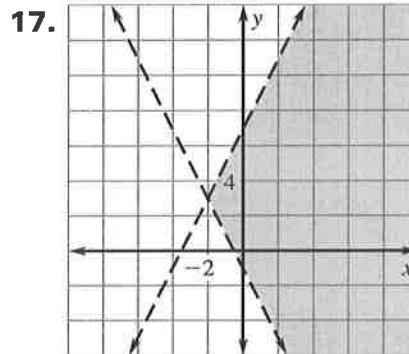
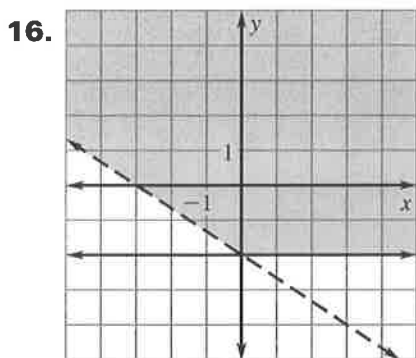
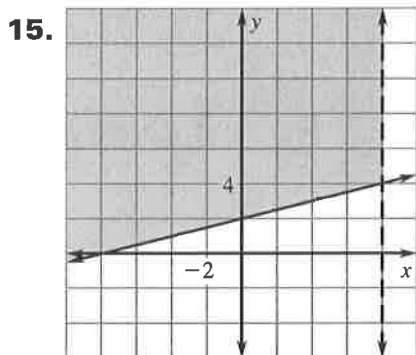
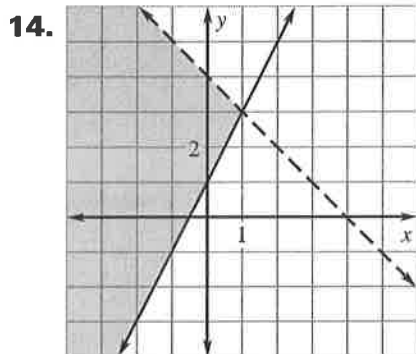
For use with pages 469–473

7.6 Skill Practice

1. solution
2. *Sample answer:* Graph each inequality then shade the region that is the intersection of the solutions to each inequality. Then check the solution with a test point.
3. not a solution
4. solution
5. not a solution
6. C 7. A 8. B

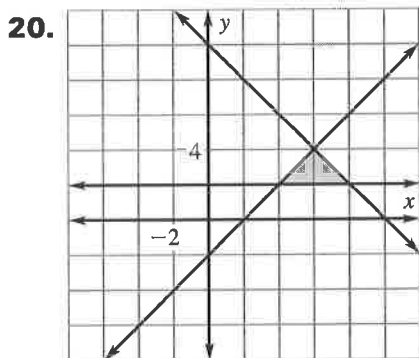


Answers for 7.6 *continued*
 For use with pages 469–473



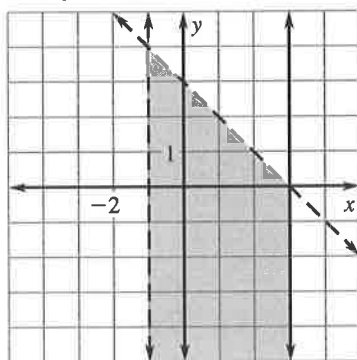
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Answers for 7.6 *continued*
For use with pages 469–473



21. D **22. B**

23. The graph is shaded to include $x + y > 3$, not $x + y < 3$.



24. $x > 1, x < 4$

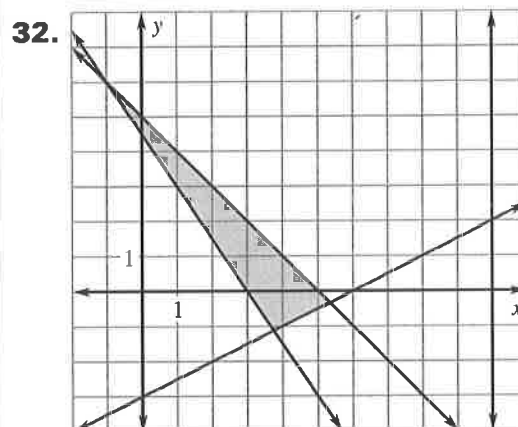
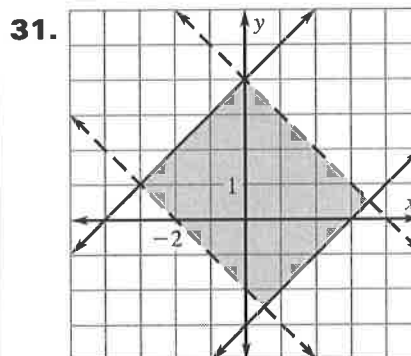
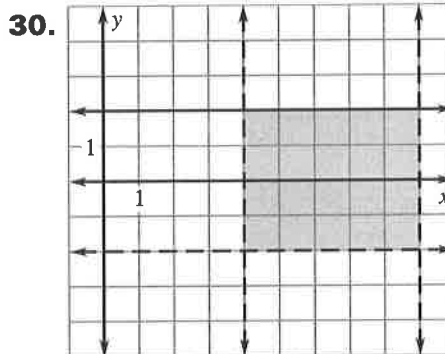
25. $y > -1, y < 4$

26. $y \geq -3, y < 2$

27. $y \leq 5x + 1, y > x - 2$

28. $y \geq 2x + 2, y \leq 2x + 5, x \leq 0, y \geq 0$

29. $y \leq x - 3, y > -2x - 1, y > -6$



33. No; there are no possible values for x and y that satisfy both equations.

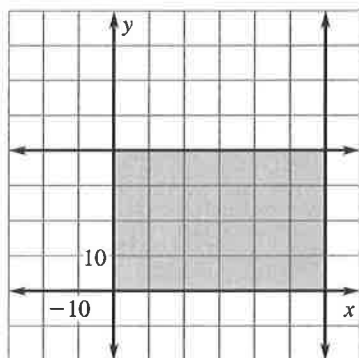
34. $x \geq 2, x \leq 6, y \geq 1, y \leq 4$

Answers for 7.6 *continued*
 For use with pages 469–473

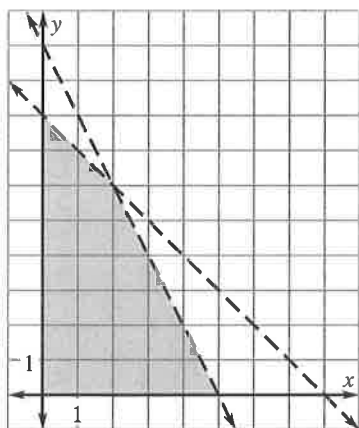
35. $y \leq \frac{1}{3}x + 1, y \geq -\frac{2}{3}x - 2,$
 $y \geq \frac{4}{3}x - 2$

7.6 Problem Solving

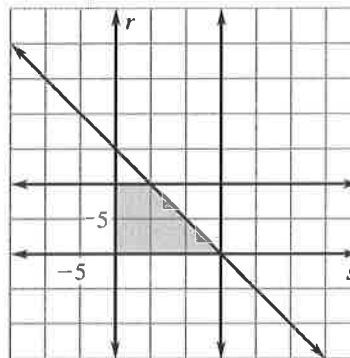
36. Let x represent the musical evaluation score and y represent the visual evaluation score.
 $x \leq 60, y \leq 40, x \geq 0, y \geq 0$



37. $14x + 7y < 70, x + y < 8,$
 $x \geq 0, y \geq 0$



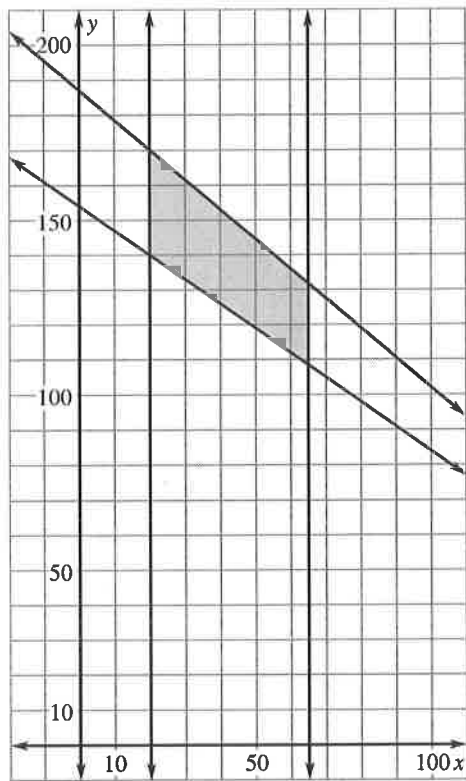
38. a. Let s represent the number of surfperch and r represent the number of rockfish. $s \leq 15,$
 $s + r \leq 15, r \leq 10, s \geq 0, r \geq 0$



- b. no

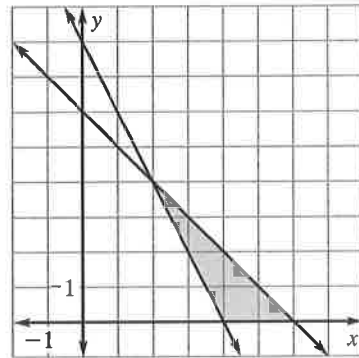
Answers for 7.6 *continued*
 For use with pages 469–473

39. a. $20 \leq x \leq 65, y \geq 154 - 0.7x,$
 $y \leq 187 - 0.85x$



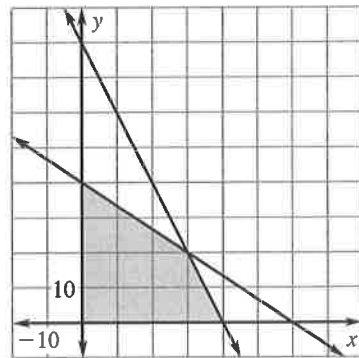
b. No. *Sample answer:*
 The heart rate is below 70%
 of the maximum heart rate.

40. a. $8x + 8y \leq 48, 4x + 2y \geq 16,$
 $x \geq 0, y \geq 0$



b. Yes. *Sample answer:*
 It would cost \$48 and give
 you 18 pictures.

41. a. $0.5x + 0.25y \leq 20,$
 $2y + 3x \leq 120, y \geq 0, x \geq 0$



b. $(0, 0), (40, 0), (0, 40), (30, 20)$

c. $(0, 0): \$0, (40, 0): \$400,$
 $(0, 40): \$320, (30, 20): \$460.$
 The maximum revenue is at
 $(30, 20)$, or 30 necklaces and
 20 bracelets.

Answers for 7.6 *continued*
For use with pages 469–473

7.6 Mixed Review

42. 52 43. 8 44. -17

45. -42 46. $-\frac{3}{5}$ 47. 33

48. (2, 7) 49. (-2, -2)

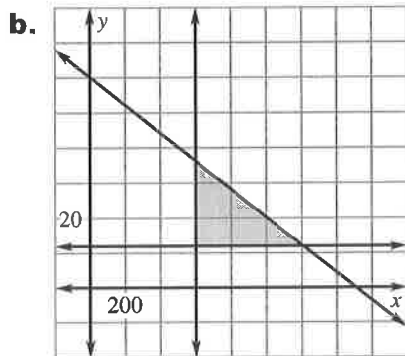
50. (5, -3) 51. (-1, 4)

52. $(-3\frac{1}{3}, -1\frac{2}{3})$

53. $(2\frac{2}{3}, -3)$

7.5–7.6 Mixed Review of Problem Solving

1. a. $x \geq 600, y \geq 12,$
 $2x + 50y \leq 3000$



c. yes

2. a. $2x + 4y = 120, x + 2y = 60$

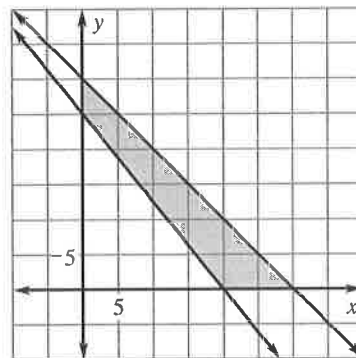
b. No. *Sample answer:* There are infinitely many solutions to the linear system.

c. ceiling paint: \$22,
wall paint: \$19

3. No; when you solve the linear system, you get $0 = 0$. So, there is not enough information to determine the cost of 1 CD.

4. No. *Sample answer:* The lines are parallel so there is never a point when the shuttles will have traveled the same distance at the same time.

5. a. Let x represent the hours working as a lifeguard, and y represent the hours working at a retail store.
 $10x + 8y \geq 200, x + y \leq 30,$
 $x \geq 0, y \geq 0$

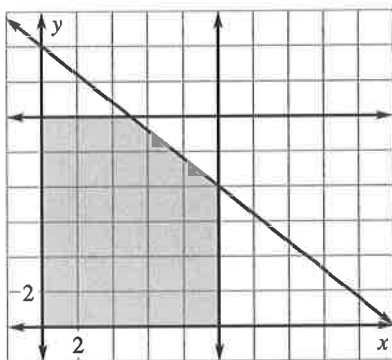


b. No; you will earn \$170.

c. $4 \leq x \leq 10$

Answers for 7.6 *continued*
 For use with pages 469–473

6. *Sample answer:* You have 80 dollars and want to buy cups at a store. Small cups are \$4, and large cups are \$5. The store has 10 small cups and 12 large cups.
 $x \geq 0, y \geq 0, x \leq 10, y \leq 12,$
 $4x + 5y \leq 80$



7. 90 ft²;

| | | | |
|--------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| | | 9 | 0 |
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| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | 0 | 0 | <input checked="" type="checkbox"/> |
| 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 |
| 6 | 6 | 6 | 6 |
| 7 | 7 | 7 | 7 |
| 8 | 8 | 8 | 8 |
| 9 | 9 | <input checked="" type="checkbox"/> | 9 |

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7

CHAPTER REVIEW

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- Multi-Language Glossary
- Vocabulary practice

REVIEW KEY VOCABULARY

- system of linear equations, p. 427
- solution of a system of linear equations, p. 427
- consistent independent system, p. 427
- inconsistent system, p. 459
- consistent dependent system, p. 459
- system of linear inequalities, p. 466
- solution of a system of linear inequalities, p. 466
- graph of a system of linear inequalities, p. 466

VOCABULARY EXERCISES

1. Copy and complete: A(n) ? consists of two or more linear inequalities in the same variables. **system of linear inequalities**
2. Copy and complete: A(n) ? consists of two or more linear equations in the same variables. **system of linear equations**
3. Describe how you would graph a system of two linear inequalities. **See margin.**
4. Give an example of a consistent dependent system. Explain why the system is a consistent dependent system. **Sample answer:** $y = 2x + 3$, $2y = 4x + 6$; the lines intersect (are consistent) and the equations are equivalent (are dependent).

REVIEW EXAMPLES AND EXERCISES

Use the review examples and exercises below to check your understanding of the concepts you have learned in each lesson of Chapter 7.

7.1 Solve Linear Systems by Graphing

pp. 427–433

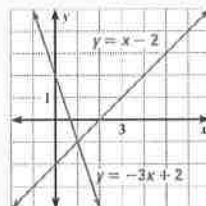
EXAMPLE

Solve the linear system by graphing. Check your solution.

$$\begin{array}{ll} y = x - 2 & \text{Equation 1} \\ y = -3x + 2 & \text{Equation 2} \end{array}$$

Graph both equations. The lines appear to intersect at (1, -1). Check the solution by substituting 1 for x and -1 for y in each equation.

$$\begin{array}{ll} y = x - 2 & y = -3x + 2 \\ -1 \stackrel{?}{=} 1 - 2 & -1 \stackrel{?}{=} -3(1) + 2 \\ -1 = -1 \checkmark & -1 = -1 \checkmark \end{array}$$



EXERCISES

Solve the linear system by graphing. Check your solution.

5. $y = -3x + 1$ (2, -5)
 $y = x - 7$
6. $y = 3x + 4$ (-1, 1)
 $y = -2x - 1$
7. $x + y = 3$ (4, -1)
 $x - y = 5$

EXAMPLES
1 and 2
on pp. 427–428
for Exs. 5–7

Extra Example 7.1

Solve the linear system by graphing. Check your solution.
 $y = -x + 4$
 $y = 2x - 5$ (3, 1)

3. **Sample answer:** Graph each inequality then shade the region that is the intersection of the solutions to each inequality. Then check the solution with a test point.

CHAPTER REVIEW

Extra Example 7.2

Solve the linear system using substitution.

$$y + 2x = 13$$

$$-x + 4y = -2 \quad (6, 1)$$

Extra Example 7.3

Solve the linear system using elimination.

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

$$-2x + 5y = -6 \quad (-12, -6)$$

EXAMPLES
1, 2, and 3
on pp. 435–437
for Exs. 8–11

7.2 Solve Linear Systems by Substitution

pp. 435–441

EXAMPLE

Solve the linear system: $3x + y = -9$ Equation 1
 $y = 5x + 7$ Equation 2

STEP 1 Substitute $5x + 7$ for y in Equation 1 and solve for x .

$$3x + y = -9 \quad \text{Write Equation 1.}$$

$$3x + 5x + 7 = -9 \quad \text{Substitute } 5x + 7 \text{ for } y.$$

$$x = -2 \quad \text{Solve for } x.$$

STEP 2 Substitute -2 for x in Equation 2 to find the value of y .

$$y = 5x + 7 = 5(-2) + 7 = -10 + 7 = -3$$

► The solution is $(-2, -3)$. Check the solution by substituting -2 for x and -3 for y in each of the original equations.

EXERCISES

Solve the linear system using substitution.

8. $y = 2x - 7$ (3, -1)
 $x + 2y = 1$

9. $x + 4y = 9$ (5, 1)
 $x - y = 4$

10. $2x + y = -15$ (-3, -9)
 $y - 5x = 6$

11. **ART** Kara spends \$16 on tubes of paint and disposable brushes for an art project. Each tube of paint costs \$3, and each disposable brush costs \$.50. Kara purchases twice as many brushes as tubes of paint. Find the number of brushes and the number of tubes of paint that she purchases.
4 tubes of paint, 8 brushes

7.3 Solve Linear Systems by Adding or Subtracting

pp. 444–450

EXAMPLE

Solve the linear system: $5x - y = 8$ Equation 1
 $-5x + 4y = -17$ Equation 2

STEP 1 Add the equations to eliminate one variable.

$$\begin{array}{r} 5x - y = 8 \\ -5x + 4y = -17 \\ \hline 3y = -9 \end{array}$$

STEP 2 Solve for y .

$$y = -3$$

STEP 3 Substitute -3 for y in either equation and solve for x .

$$5x - y = 8 \quad \text{Write Equation 1.}$$

$$5x - (-3) = 8 \quad \text{Substitute } -3 \text{ for } y.$$

$$x = 1 \quad \text{Solve for } x.$$

► The solution is $(1, -3)$. Check the solution by substituting 1 for x and -3 for y in each of the original equations.

EXAMPLES
1, 2, and 3
on pp. 444-445
for Exs. 12-17

EXERCISES

Solve the linear system using elimination.

- | | | |
|----------------------------|----------------------------|----------------------------|
| 12. $x + 2y = 13$ (3, 5) | 13. $4x - 5y = 14$ (1, -2) | 14. $x + 7y = 12$ (-2, 2) |
| $x - 2y = -7$ | $-4x + y = -6$ | $-2x + 7y = 18$ |
| 15. $9x - 2y = 34$ (6, 10) | 16. $3x = y + 1$ (-8, -25) | 17. $4y = 11 - 3x$ (-7, 8) |
| $5x - 2y = 10$ | $2x - y = 9$ | $3x + 2y = -5$ |

Extra Example 7.4

Solve the linear system using elimination.

$3x - 2y = 5$
 $2x - 3y = 5$ (1, -1)

7.4 Solve Linear Systems by Multiplying First

pp. 451-457

EXAMPLE

Solve the linear system: $x - 2y = -7$ Equation 1
 $3x - y = 4$ Equation 2

STEP 1 Multiply the first equation by -3.

| | | |
|---------------|---------------|-----------------|
| $x - 2y = -7$ | $\times (-3)$ | $-3x + 6y = 21$ |
| $3x - y = 4$ | | $3x - y = 4$ |
| <hr/> | | |

STEP 2 Add the equations.

$5y = 25$

STEP 3 Solve for y.

$y = 5$

STEP 4 Substitute 5 for y in either of the original equations and solve for x.

$x - 2y = -7$ Write Equation 1.

$x - 2(5) = -7$ Substitute 5 for y.

$x = 3$ Solve for x.

▶ The solution is (3, 5).

CHECK Substitute 3 for x and 5 for y in each of the original equations.

| | |
|-------------------------------|------------------------------|
| Equation 1 | Equation 2 |
| $x - 2y = -7$ | $3x - y = 4$ |
| $3 - 2(5) \stackrel{?}{=} -7$ | $3(3) - 5 \stackrel{?}{=} 4$ |
| $-7 = -7 \checkmark$ | $4 = 4 \checkmark$ |

EXERCISES

Solve the linear system using elimination.

- | | | |
|---------------------------|---------------------------|-----------------------------|
| 18. $-x + y = -4$ (7, 3) | 19. $x + 6y = 28$ (-2, 5) | 20. $3x - 5y = -7$ (-9, -4) |
| $2x - 3y = 5$ | $2x - 3y = -19$ | $-4x + 7y = 8$ |
| 21. $8x - 7y = -3$ (4, 5) | 22. $5x = 3y - 2$ (2, 4) | 23. $11x = 2y - 1$ (1, 6) |
| $6x - 5y = -1$ | $3x + 2y = 14$ | $3y = 10 + 8x$ |

24. **CAR MAINTENANCE** You pay \$24.50 for 10 gallons of gasoline and 1 quart of oil at a gas station. Your friend pays \$22 for 8 gallons of the same gasoline and 2 quarts of the same oil. Find the cost of 1 quart of oil. \$2

EXAMPLES
1 and 2
on pp. 451-452
for Exs. 18-24

Extra Example 7.5

Show that the linear system has infinitely many solutions.

$$y = -2x - 4$$

$$6x + 3y = -12$$

Substitute $-2x - 4$ for y in the equation $6x + 3y = -12$ and solve for x .

$$6x + 3y = -12$$

$$6x + 3(-2x - 4) = -12$$

$$6x - 6x - 12 = -12$$

$$-12 = -12$$

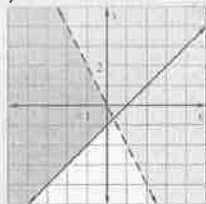
Since this is a true statement, the system has infinitely many solutions.

Extra Example 7.6

Graph the system of linear inequalities.

$$y \geq x - 1$$

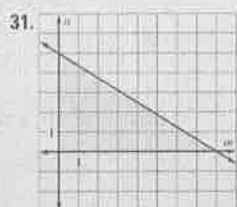
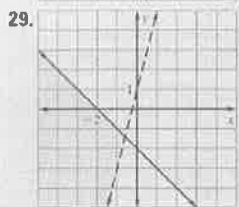
$$y < -2x$$



25. No solution. *Sample answer:* When the variables are eliminated, a false statement remains, which means there is no solution.

26. Infinitely many solutions. *Sample answer:* When the variables are eliminated, a true statement remains, which means there are infinitely many solutions.

27. One solution. *Sample answer:* The lines have different slopes, so there is only one solution.

**7.5 Solve Special Types of Linear Systems**

pp. 459–465

EXAMPLE

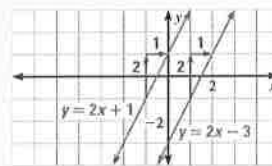
Show that the linear system has no solution.

$$-2x + y = -3 \quad \text{Equation 1}$$

$$y = 2x + 1 \quad \text{Equation 2}$$

Graph the linear system.

The lines are parallel because they have the same slope but different y -intercepts. Parallel lines do not intersect, so the system has no solution.

**EXERCISES**

Tell whether the linear system has *one solution*, *no solution*, or *infinitely many solutions*. Explain. 25–27. See margin.

25. $x = 2y - 3$
 $1.5x - 3y = 0$

26. $-x + y = 8$
 $x + 8 = y$

27. $4x = 2y + 6$
 $4x + 2y = 10$

EXAMPLES
1, 2, and 3
on pp. 459–461
for Exs. 25–27

7.6 Solve Systems of Linear Inequalities

pp. 466–472

EXAMPLE

Graph the system of linear inequalities.

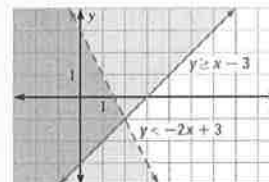
$$y < -2x + 3 \quad \text{Inequality 1}$$

$$y \geq x - 3 \quad \text{Inequality 2}$$

The graph of $y < -2x + 3$ is the half-plane *below* the *dashed* line $y = -2x + 3$.

The graph of $y \geq x - 3$ is the half-plane *on and above* the *solid* line $y = x - 3$.

The graph of the system is the intersection of the two half-planes shown as the darker shade of blue.

**EXERCISES**

Graph the system of linear inequalities. 28–30. See margin.

28. $y < x + 3$
 $y > -3x - 2$

29. $y \leq -x - 2$
 $y > 4x + 1$

30. $y \geq 0$
 $x \leq 2$
 $y < x + 4$

EXAMPLES
1, 2, 3, and 4
on pp. 466–468
for Exs. 28–31

31. **MOVIE COSTS** You receive a \$40 gift card to a movie theater. A ticket to a matinee movie costs \$5, and a ticket to an evening movie costs \$8. Write and graph a system of inequalities for the number of tickets you can purchase using the gift card. Let m represent the number of matinee movies and n represent the number of evening movies. $5m + 8n \leq 40$, $m \geq 0$, $n \geq 0$, see margin for art.



CHAPTER TEST

Solve the linear system by graphing. Check your solution.

1. $3x - y = -6$ $(-1, 3)$
 $x + y = 2$

2. $-2x + y = 5$ $(-2, 1)$
 $x + y = -1$

3. $y = 4x + 4$ $(\frac{4}{11}, \frac{55}{11})$
 $3x + 2y = 12$

4. $5x - 4y = 20$ $(4, 0)$
 $x + 2y = 4$

5. $x + 3y = 9$ $(3, 2)$
 $2x - y = 4$

6. $2x + 7y = 14$ $(-7, 4)$
 $5x + 7y = -7$

Solve the linear system using substitution.

7. $y = 5x - 7$ $(6, 23)$
 $-4x + y = -1$

8. $x = y - 11$ $(-17, -6)$
 $x - 3y = 1$

9. $3x + y = -19$ $(-3, -10)$
 $x - y = 7$

10. $15x + y = 70$ $(4, 10)$
 $3x - 2y = -8$

11. $3y + x = 17$ $(3.5, 4.5)$
 $x + y = 8$

12. $0.5x + y = 9$
 $1.6x + 0.2y = 13$
 $(\frac{7}{15}, \frac{54}{15})$

Solve the linear system using elimination.

13. $8x + 3y = -9$ $(-3, 5)$
 $-8x + y = 29$

14. $x - 5y = -3$ $(7, 2)$
 $3x - 5y = 11$

15. $4x + y = 17$ $(4, 1)$
 $7y = 4x - 9$

16. $3x + 2y = -5$ $(3, -7)$
 $x - y = 10$

17. $3y = x + 5$ $(16, 7)$
 $-3x + 8y = 8$

18. $6x - 5y = 9$ $(4, 3)$
 $9x - 7y = 15$

Tell whether the linear system has *one solution*, *no solution*, or *infinitely many solutions*.

19. $15x - 3y = 12$
 $y = 5x - 4$

20. $4x - y = -4$ *no solution*
 $-8x + 2y = 2$

21. $-12x + 3y = 18$
 $4x + y = -6$

22. $6x - 7y = 5$
 $-12x + 14y = 10$

23. $3x - 4y = 24$ *one solution*
 $3x + 4y = 24$

24. $10x - 2y = 14$
 $15x - 3y = 21$
infinitely many solutions

Graph the system of linear inequalities. 25–27. See margin.

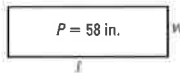
25. $y < 2x + 2$
 $y \geq -x - 1$

26. $y \leq 3x - 2$
 $y > x + 4$

27. $y \leq 3$
 $x > -1$
 $y > 3x - 3$

28. **TRUCK RENTALS** Carrie and Dave each rent the same size moving truck for one day. They pay a fee of x dollars for the truck and y dollars per mile they drive. Carrie drives 150 miles and pays \$215. Dave drives 120 miles and pays \$176. Find the amount of the fee and the cost per mile.
flat fee: \$20, cost per mile: \$1.30

29. **GEOMETRY** The rectangle has a perimeter P of 58 inches. The length l is one more than 3 times the width w . Write and solve a system of linear equations to find the length and width of the rectangle.
 $2l + 2w = 58$, $l = 3w + 1$, $l = 22$ in., $w = 7$ in.



30. **COMMUNITY SERVICE** A town committee has a budget of \$75 to spend on snacks for the volunteers participating in a clean-up day. The committee chairperson decides to purchase granola bars and at least 50 bottles of water. Granola bars cost \$.50 each, and bottles of water cost \$.75 each. Write and graph a system of linear inequalities for the number of bottles of water and the number of granola bars that can be purchased. **See margin.**

Additional Resources

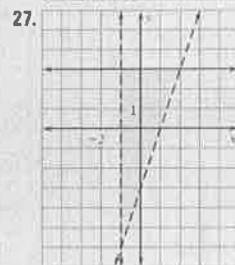
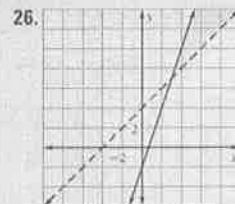
Assessment Book

- Chapter Test, Levels A, B, C, pp. 93–98
- Standardized Chapter Test, pp. 99–100
- SAT/ACT Chapter Test, pp. 101–102
- Alternative Assessment, pp. 103–104

Test Generator CD-ROM

Chapter Test

Easily-readable reduced copies (with answers) of Chapter Test B, the Standardized Chapter Test, and the Alternative Assessment from the Assessment Book can be found on pp. 424G–424H.



30. Let w represent the number of water bottles and g represent the number of granola bars; $w \geq 50$, $g \geq 0$, $0.5g + 0.75w \leq 75$.

