

3.2 EXERCISES

HOMEWORK KEY

- = WORKED-OUT SOLUTIONS
on p. WS5 for Exs. 5, 29, and 59
- ★ = STANDARDIZED TEST PRACTICE
Exs. 2, 40, 50, 57, 58, and 60

SKILL PRACTICE

- VOCABULARY** Copy and complete: To solve a linear system where one of the coefficients is 1 or -1 , it is usually easiest to use the ? method.
- ★ WRITING** Explain how to use the elimination method to solve a linear system.

EXAMPLES 1 and 4

on pp. 160–163
for Exs. 3–14

SUBSTITUTION METHOD Solve the system using the substitution method.

- | | | |
|------------------------------------|--------------------------------------|--------------------------------------|
| 3. $2x + 5y = 7$
$x + 4y = 2$ | 4. $3x + y = 16$
$2x - 3y = -4$ | 5. $6x - 2y = 5$
$-3x + y = 7$ |
| 6. $x + 4y = 1$
$3x + 2y = -12$ | 7. $3x - y = 2$
$6x + 3y = 14$ | 8. $3x - 4y = -5$
$-x + 3y = -5$ |
| 9. $3x + 2y = 6$
$x - 4y = -12$ | 10. $6x - 3y = 15$
$-2x + y = -5$ | 11. $3x + y = -1$
$2x + 3y = 18$ |
| 12. $2x - y = 1$
$8x + 4y = 6$ | 13. $3x + 7y = 13$
$x + 3y = -7$ | 14. $2x + 5y = 10$
$-3x + y = 36$ |

EXAMPLES 2 and 4

on pp. 161–163
for Exs. 15–27

ELIMINATION METHOD Solve the system using the elimination method.

- | | | |
|---------------------------------------|--|--|
| 15. $2x + 6y = 17$
$2x - 10y = 9$ | 16. $4x - 2y = -16$
$-3x + 4y = 12$ | 17. $3x - 4y = -10$
$6x + 3y = -42$ |
| 18. $4x - 3y = 10$
$8x - 6y = 20$ | 19. $5x - 3y = -3$
$2x + 6y = 0$ | 20. $10x - 2y = 16$
$5x + 3y = -12$ |
| 21. $2x + 5y = 14$
$3x - 2y = -36$ | 22. $7x + 2y = 11$
$-2x + 3y = 29$ | 23. $3x + 4y = 18$
$6x + 8y = 18$ |
| 24. $2x + 5y = 13$
$6x + 2y = -13$ | 25. $4x - 5y = 13$
$6x + 2y = 48$ | 26. $6x - 4y = 14$
$2x + 8y = 21$ |

- ERROR ANALYSIS** Describe and correct the error in the first step of solving the system.

$$\begin{aligned} 3x + 2y &= 7 \\ 5x + 4y &= 15 \end{aligned}$$

$$\begin{aligned} -6x - 4y &= 7 \\ 5x + 4y &= 15 \end{aligned}$$

$$\begin{aligned} -x &= 22 \\ x &= -22 \end{aligned}$$




CHOOSING A METHOD Solve the system using any algebraic method.

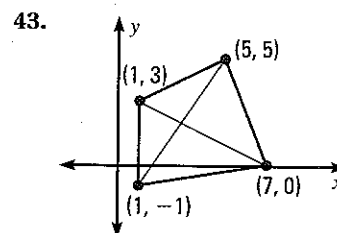
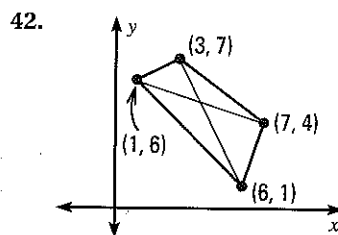
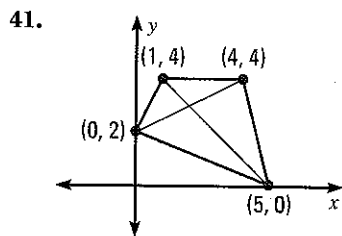
- | | | |
|--|---------------------------------------|--------------------------------------|
| 28. $3x + 2y = 11$
$4x + y = -2$ | 29. $2x - 3y = 8$
$-4x + 5y = -10$ | 30. $3x + 7y = -1$
$2x + 3y = 6$ |
| 31. $4x - 10y = 18$
$-2x + 5y = -9$ | 32. $3x - y = -2$
$5x + 2y = 15$ | 33. $x + 2y = -8$
$3x - 4y = -24$ |
| 34. $2x + 3y = -6$
$3x - 4y = 25$ | 35. $3x + y = 15$
$-x + 2y = -19$ | 36. $4x - 3y = 8$
$-8x + 6y = 16$ |
| 37. $4x - y = -10$
$6x + 2y = -1$ | 38. $7x + 5y = -12$
$3x - 4y = 1$ | 39. $2x + y = -1$
$-4x + 6y = 6$ |

40. ★ **MULTIPLE CHOICE** What is the solution of the linear system?

$$\begin{aligned} 3x + 2y &= 4 \\ 6x - 3y &= -27 \end{aligned}$$

- (A) $(-2, -5)$ (B) $(-2, 5)$ (C) $(2, -5)$ (D) $(2, 5)$

 **GEOMETRY** Find the coordinates of the point where the diagonals of the quadrilateral intersect.



SOLVING LINEAR SYSTEMS Solve the system using any algebraic method.

44. $0.02x - 0.05y = -0.38$ 45. $0.05x - 0.03y = 0.21$ 46. $\frac{2}{3}x + 3y = -34$
 $0.03x + 0.04y = 1.04$ $0.07x + 0.02y = 0.16$ $x - \frac{1}{2}y = -1$
47. $\frac{1}{2}x + \frac{2}{3}y = \frac{5}{6}$ 48. $\frac{x+3}{4} + \frac{y-1}{3} = 1$ 49. $\frac{x-1}{2} + \frac{y+2}{3} = 4$
 $\frac{5}{12}x + \frac{7}{12}y = \frac{3}{4}$ $2x - y = 12$ $x - 2y = 5$

50. ★ **OPEN-ENDED MATH** Write a system of linear equations that has $(-1, 4)$ as its only solution. Verify that $(-1, 4)$ is a solution using either the substitution method or the elimination method.

SOLVING NONLINEAR SYSTEMS Use the elimination method to solve the system.

51. $7y + 18xy = 30$ 52. $xy - x = 14$ 53. $2xy + y = 44$
 $13y - 18xy = 90$ $5 - xy = 2x$ $32 - xy = 3y$

54. **CHALLENGE** Find values of r , s , and t that produce the indicated solution(s).


$$\begin{aligned} -3x - 5y &= 9 \\ rx + sy &= t \end{aligned}$$

- a. No solution b. Infinitely many solutions c. A solution of $(2, -3)$


PROBLEM SOLVING

EXAMPLE 3
 on p. 162
 for Exs. 55–59

55. **GUITAR SALES** In one week, a music store sold 9 guitars for a total of \$3611. Electric guitars sold for \$479 each and acoustic guitars sold for \$339 each. How many of each type of guitar were sold?

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56. **COUNTY FAIR** An adult pass for a county fair costs \$2 more than a children's pass. When 378 adult and 214 children's passes were sold, the total revenue was \$2384. Find the cost of an adult pass.

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57. ★ **SHORT RESPONSE** A company produces gas mowers and electric mowers at two factories. The company has orders for 2200 gas mowers and 1400 electric mowers. The production capacity of each factory (in mowers per week) is shown in the table.

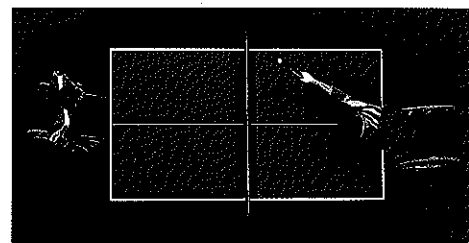
	Factory A	Factory B
Gas mowers	200	400
Electric mowers	100	300

Describe how the company can fill its orders by operating the factories simultaneously at full capacity. Write and solve a linear system to support your answer.

58. ★ **MULTIPLE CHOICE** The cost of 11 gallons of regular gasoline and 16 gallons of premium gasoline is \$58.55. Premium costs \$.20 more per gallon than regular. What is the cost of a gallon of premium gasoline?

(A) \$.205 (B) \$2.25 (C) \$2.29 (D) \$2.55

59. **TABLE TENNIS** One evening, 76 people gathered to play doubles and singles table tennis. There were 26 games in progress at one time. A doubles game requires 4 players and a singles game requires 2 players. How many games of each kind were in progress at one time if all 76 people were playing?



60. ★ **EXTENDED RESPONSE** A local hospital is holding a two day marathon walk to raise funds for a new research facility. The total distance of the marathon is 26.2 miles. On the first day, Martha starts walking at 10:00 A.M. She walks 4 miles per hour. Carol starts two hours later than Martha but decides to run to catch up to Martha. Carol runs at a speed of 6 miles per hour.
- Write an equation to represent the distance Martha travels.
 - Write an equation to represent the distance Carol travels.
 - Solve the system of equations to find when Carol will catch up to Martha.
 - Carol wants to reduce the time she takes to catch up to Martha by 1 hour. How can she do this by changing her starting time? How can she do this by changing her speed? *Explain* whether your answers are reasonable.
61. **BUSINESS** A nut wholesaler sells a mix of peanuts and cashews. The wholesaler charges \$2.80 per pound for peanuts and \$5.30 per pound for cashews. The mix is to sell for \$3.30 per pound. How many pounds of peanuts and how many pounds of cashews should be used to make 100 pounds of the mix?
62. **AVIATION** Flying with the wind, a plane flew 1000 miles in 5 hours. Flying against the wind, the plane could fly only 500 miles in the same amount of time. Find the speed of the plane in calm air and the speed of the wind.
63. **CHALLENGE** For a recent job, an electrician earned \$50 per hour, and the electrician's apprentice earned \$20 per hour. The electrician worked 4 hours more than the apprentice, and together they earned a total of \$550. How much money did each person earn?

MIXED REVIEW

Solve the equation.

64. $-5x + 4 = 29$ (p. 18)

65. $6(2a - 3) = -30$ (p. 18)

66. $1.2m = 2.3m - 2.2$ (p. 18)

67. $|x + 3| = 4$ (p. 51)

68. $|2x + 11| = 3$ (p. 51)

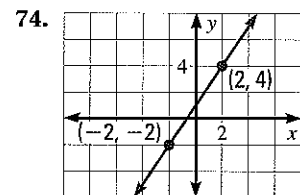
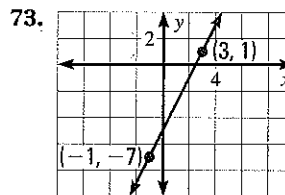
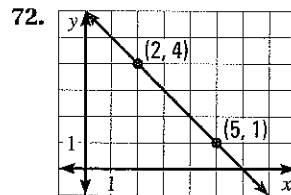
69. $|-x + 7| = 13$ (p. 51)

Tell whether the lines are *parallel*, *perpendicular*, or *neither*. (p. 82)

70. Line 1: through (2, 10) and (1, 5)
Line 2: through (3, -7) and (8, -8)

71. Line 1: through (4, 5) and (9, -2)
Line 2: through (6, -6) and (-2, -1)

Write an equation of the line. (p. 98)



PREVIEW

Prepare for
Lesson 3.3
in Exs. 75–80.

Graph the inequality in a coordinate plane. (p. 132)

75. $x < -3$

76. $y \geq 2$

77. $2x + y > 1$

78. $y \leq -x + 4$

79. $4x - y \geq 5$

80. $y < -3x + 2$

QUIZ for Lessons 3.1–3.2

Graph the linear system and estimate the solution. Then check the solution algebraically. (p. 153)

1. $3x + y = 11$
 $x - 2y = -8$

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

3. $x - 2y = -2$
 $3x + y = -20$

Solve the system. Then classify the system as *consistent and independent*, *consistent and dependent*, or *inconsistent*. (p. 153)

4. $4x + 8y = 8$
 $x + 2y = 6$

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

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

Solve the system using the substitution method. (p. 160)

7. $3x - y = -4$
 $x + 3y = -28$

8. $x + 5y = 1$
 $-3x + 4y = 16$

9. $6x + y = -6$
 $4x + 3y = 17$

Solve the system using the elimination method. (p. 160)

10. $2x - 3y = -1$
 $2x + 3y = -19$

11. $3x - 2y = 10$
 $-6x + 4y = -20$

12. $2x + 3y = 17$
 $5x + 8y = 20$

13. **HOME ELECTRONICS** To connect a VCR to a television set, you need a cable with special connectors at both ends. Suppose you buy a 6 foot cable for \$15.50 and a 3 foot cable for \$10.25. Assuming that the cost of a cable is the sum of the cost of the two connectors and the cost of the cable itself, what would you expect to pay for a 4 foot cable? *Explain* how you got your answer.