3.1 EXERCISES

HOMEWORK KEY

- ○ = **WORKED-OUT SOLUTIONS** on p. WS4 for Exs. 9, 21, and 37
- ★ = **STANDARDIZED TEST PRACTICE** Exs. 2, 15, 29, 30, 37, and 39
- ◆ = **MULTIPLE REPRESENTATIONS** Ex. 38

SKILL PRACTICE

1. **VOCABULARY** Copy and complete: A consistent system that has exactly one solution is called ___?___.

2. ★ **WRITING** *Explain* how to identify the solution(s) of a system from the graphs of the equations in the system.

EXAMPLE 1 on p. 153 for Exs. 3–16

GRAPH AND CHECK **Graph the linear system and estimate the solution. Then check the solution algebraically.**

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

4. $y = 5x + 2$
   $y = 3x$

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

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

7. $y = 2x - 10$
   $x - 4y = 5$

8. $-x + 6y = -12$
   $x + 6y = 12$

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

10. $y = -3x - 13$
    $-x - 2y = -4$

11. $x - 7y = 6$
    $-3x + 21y = -18$

12. $y = 4x + 3$
    $20x - 5y = -15$

13. $5x - 4y = 3$
    $3x + 2y = 15$

14. $7x + y = -17$
    $3x - 10y = 24$

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

$$-4x - y = 2$$
$$7x + 2y = -5$$

(A) $(2, -6)$ (B) $(-1, 6)$ (C) $(1, -6)$ (D) $(-3, 8)$

16. **ERROR ANALYSIS** A student used the check shown to conclude that $(0, -1)$ is a solution of this system:

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

$$3x - 2y = 2$$
$$3(0) - 2(-1) \stackrel{?}{=} 2$$
$$2 = 2$$

Describe and correct the student's error.

EXAMPLES 2 and 3 on p. 154 for Exs. 17–29

SOLVE AND CLASSIFY **Solve the system. Then classify the system as *consistent and independent*, *consistent and dependent*, or *inconsistent*.**

17. $y = -1$
    $3x + y = 5$

18. $2x - y = 4$
    $x - 2y = -1$

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

20. $y = 2x - 1$
    $-6x + 3y = -3$

21. $-20x + 12y = -24$
    $5x - 3y = 6$

22. $4x - 5y = 0$
    $3x - 5y = -5$

23. $3x + 7y = 6$
    $2x + 9y = 4$

24. $4x + 5y = 3$
    $6x + 9y = 9$

25. $8x + 9y = 15$
    $5x - 2y = 17$

26. $\frac{1}{2}x - 3y = 10$
    $\frac{1}{4}x + 2y = -2$

27. $3x - 2y = -15$
    $x - \frac{2}{3}y = -5$

28. $\frac{5}{2}x - y = -4$
    $5x - 2y = \frac{1}{4}$

29. ★ **MULTIPLE CHOICE** How would you classify the system?

$$-12x + 16y = 10$$
$$3x + 4y = -6$$

(A) Consistent and independent (B) Consistent and dependent

(C) Inconsistent (D) None of these

30. ★ **OPEN-ENDED MATH** Write a system of two linear equations that has the given number of solutions.

a. One solution **b.** No solution **c.** Infinitely many solutions

GRAPH AND CHECK Graph the system and estimate the solution(s). Then check the solution(s) algebraically.

31. $y = |x + 2|$
$y = x$

32. $y = |x - 1|$
$y = -x + 4$

33. $y = |x| - 2$
$y = 2$

34. **CHALLENGE** State the conditions on the constants a, b, c, and d for which the system below is **(a)** consistent and independent, **(b)** consistent and dependent, and **(c)** inconsistent.

$$y = ax + b$$
$$y = cx + d$$

PROBLEM SOLVING

EXAMPLE 4 on p. 155 for Exs. 35–39

35. **WORK SCHEDULE** You worked 14 hours last week and earned a total of $96 before taxes. Your job as a lifeguard pays $8 per hour, and your job as a cashier pays $6 per hour. How many hours did you work at each job?

@HomeTutor for problem solving help at classzone.com

36. **LAW ENFORCEMENT** During one calendar year, a state trooper issued a total of 375 citations for warnings and speeding tickets. Of these, there were 37 more warnings than speeding tickets. How many warnings and how many speeding tickets were issued?

@HomeTutor for problem solving help at classzone.com

37. ★ **SHORT RESPONSE** A gym offers two options for membership plans. Option A includes an initiation fee of $121 and costs $1 per day. Option B has no initiation fee but costs $12 per day. After how many days will the total costs of the gym membership plans be equal? How does your answer change if the daily cost of Option B increases? *Explain.*

38. ◆ **MULTIPLE REPRESENTATIONS** The price of refrigerator A is $600, and the price of refrigerator B is $1200. The cost of electricity needed to operate the refrigerators is $50 per year for refrigerator A and $40 per year for refrigerator B.

a. **Writing Equations** Write an equation for the cost of owning refrigerator A and an equation for the cost of owning refrigerator B.

b. **Graphing Equations** Graph the equations from part (a). After how many years are the total costs of owning the refrigerators equal?

c. **Checking Reasonableness** Is your solution from part (b) reasonable in this situation? *Explain.*

39. ★ **EXTENDED RESPONSE** The table below gives the winning times (in seconds) in the Olympic 100 meter freestyle swimming event for the period 1972–2000.

Years since 1972, x	0	4	8	12	16	20	24	28
Men's time, m	51.2	50.0	50.4	49.8	48.6	49.0	48.7	48.3
Women's time, w	58.6	55.7	54.8	55.9	54.9	54.6	54.4	53.8

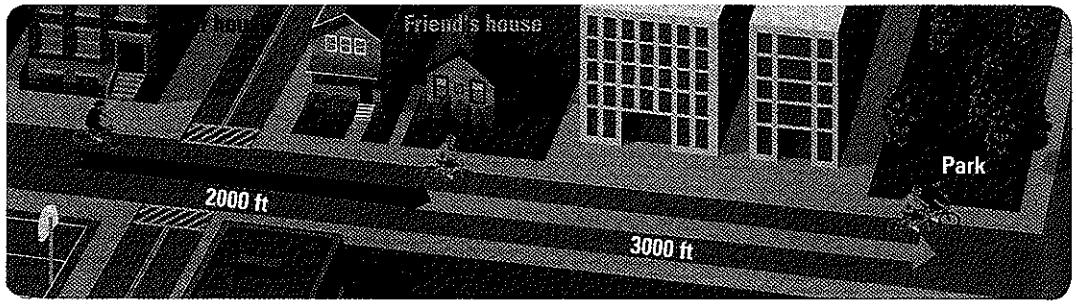
a. Use a graphing calculator to fit a line to the data pairs (x, m).

b. Use a graphing calculator to fit a line to the data pairs (x, w).

c. Graph the lines and predict when the women's performance will catch up to the men's performance.

d. Do you think your prediction from part (c) is reasonable? *Explain.*

40. **CHALLENGE** Your house and your friend's house are both on a street that passes by a park, as shown below.



At 1:00 P.M., you and your friend leave your houses on bicycles and head toward the park. You travel at a speed of 25 feet per second, and your friend also travels at a constant speed. You both reach the park at the same time.

a. Write and graph an equation giving your distance d (in feet) from the park after t seconds.

b. At what speed does your friend travel to the park? *Explain* how you found your answer.

c. Write an equation giving your friend's distance d (in feet) from the park after t seconds. Graph the equation in the same coordinate plane you used for part (a).

MIXED REVIEW

Solve the equation.

41. $8x + 1 = 3x - 14$ ***(p. 18)***

42. $-4(x + 3) = 5x + 9$ ***(p. 18)***

43. $x + 2 = \frac{3}{2}x - \frac{5}{4}$ ***(p. 18)***

44. $|x - 18| = 9$ ***(p. 51)***

45. $|2x + 5| = 12$ ***(p. 51)***

46. $|5x - 18| = 17$ ***(p. 51)***

PREVIEW
Prepare for Lesson 3.2 in Exs. 47–52.

Solve the equation for y. Then find the value of y for the given value of x. ***(p. 26)***

47. $3x - 2y = 8; x = -2$

48. $-5x + y = -12; x = 9$

49. $8x - 3y = 10; x = 8$

50. $8x - 2y = 7; x = -1$

51. $16x + 9y = -24; x = -6$

52. $-12x + 9y = -60; x = -7$

53. **VETERINARY MEDICINE** The normal body temperature of a dog is 38°C. Your dog's temperature is 101°F. Does your dog have a fever? *Explain.* ***(p. 26)***

EXTRA PRACTICE for Lesson 3.1, p. 1012 **ONLINE QUIZ** at classzone.com