ms

ages 651–657

vish to preteach some of the key
d in this chapter. Particularly for
nguage Learners (ELL),
g the vocabulary before the
lesson begins gives students a
t into understanding the new
Writing new words on poster
nting to the words as you say
n displaying the poster for a
time is a useful technique.

nethod (p. 367)
t system of equations (p. 360)
nt system of equations (p. 360)
nt system of equations (p. 360)
nbination (p. 368)
f a system of equations (p. 358)
on method (p. 362)
f equations (p. 358)

CHAPTER 8

What You'll Learn in Chapter 8

- To solve systems of two equations in two variables by graphing
- To solve systems of equations by the substitution and the addition methods
- To solve motion, digit, and coin problems using systems of equations

Skills & Concepts You Need for Chapter 8

3-1 to 3-3 Solve.

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

3. $-3x + 2 = -10$ **4.** $3x + 4 = 19$

5. $6x + 2x = 45$ **6.** $-7y - 8y = -30$

3-4 Write as an algebraic expression.

7. 8 more than twice a number

8. the value of x dimes plus the value of y nickels

3-5 Solve.

9. $6x + 5 = 2x + 13$ **10.** $9(t + 2) = 6(t - 2)$

5-6 Evaluate each polynomial for $w = -2$.

11. $3 + 4w$ **12.** $-7w - 8$ **13.** $w^2 - 2w + 3$

7-2

14. Determine whether $(3, -2)$ is a solution of $y = 4x - 14$.

15. Determine whether $(-1, 5)$ is a solution of $y = -3x - 2$.

Find three solutions of each equation.

16. $y = 3x - 1$ **17.** $2w + 4x = -7$ **18.** $-4y - 2z = 10$

7-3, 7-5 Graph the following equations.

19. $2x - 4y = 1$ **20.** $-x + 3y = 5$

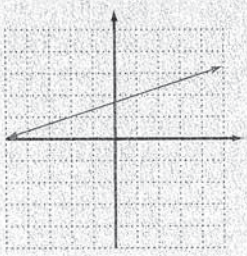
21. $y = -2$ **22.** $x = 5$

Concepts You Need For
8

-5
2/9
4
5
45/8
2
3n+8
10x+5y
2
-10
-5
6
11
Yes
No
nswers may vary.

16-18. Answers may vary.

20.



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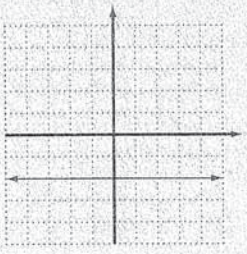

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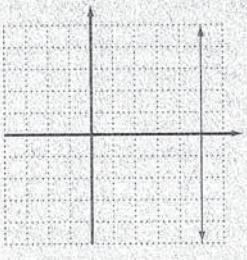
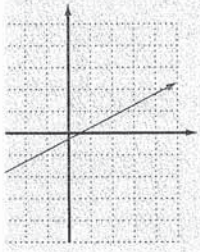




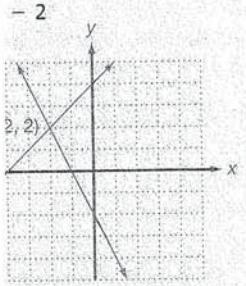
ICE/ASSESS

Z

e whether the ordered pair
solution of the system.
= 23
21

e whether the ordered pair
a solution of the system.
= 7
= 4

graphing.
4
− 2



ent Guide

de flexible scheduling, this
ın be split into parts.
1–8, 21–24
sion 26, 28, 29
9–20
sion 25, 27

ed Review to maintain skills.

Try This Solve by graphing.

c. $x + 4y = -6$
$2x - 3y = -1$

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

e. $y - 2x = 7$
$y = 2x + 8$

f. $3y - 2x = 6$
$4x - 6y = -12$

Extra Help On the Web

Look for worked-out examples at the Prentice Hall Web site.
www.phschool.com

8-1 Exercises

A

Determine whether the given ordered pair is a solution of the system of equations.

1. $(3, 2)$; $2x + 3y = 12$
$x - 4y = -5$

2. $(1, 5)$; $5x - 2y = -5$
$3x - 7y = -32$

3. $(3, 2)$; $3t - 2s = 0$
$t + 2s = 15$

4. $(2, -2)$; $b + 2a = 2$
$b - a = -4$

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

6. $(-3, 4)$; $2x = -y - 2$
$y = -4$

7. $(12, 3)$; $y = \frac{1}{4}x$
$3x - y = 33$

8. $(-3, 1)$; $y = -\frac{1}{3}x$
$3y = -5x - 12$

Solve by graphing.

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

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

11. $x + 2y = 10$
$3x + 4y = 8$

12. $-3x = 5 - y$
$2y = 6x + 10$

13. $a = \frac{1}{2}b + 1$
$a - 2b = -2$

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

B

Solve these systems graphically.

15. $y = 3$
$x = 5$

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

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

18. $x + y = 9$
$3x + 3y = 27$

19. $x + y = 4$
$x + y = -4$

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

21. A system of equations that has one or more solutions is called **consistent.** Which systems of equations in Exercises 9–20 are consistent?

22. A system of equations that has infinitely many solutions is called consistent and **dependent.** Which systems of equations in Exercises 9–20 are dependent?

23. A system of equations that has no solution is called **inconsistent.** Which systems of equations in Exercises 9–20 are inconsistent?

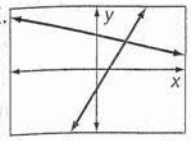
Try This

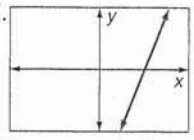
c. $(-2, -1)$
d. $(0, 5)$
e. No solution
f. Infinitely many solutions

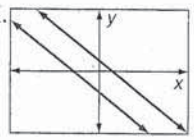
Exercises

1. Yes
2. Yes
3. No
4. Yes
5. Yes
6. No
7. Yes
8. Yes
9. $(2, 1)$
10. $(4, 2)$
11. $(-12, 11)$
12. Infinitely many solutions
13. $(2, 2)$
14. $(1, -3)$
15. $(5, 3)$
16. $(4, 3)$
17. $\left(\frac{1}{3}, 1\right)$
18. Infinitely many solutions
19. No solution
20. No solution
21. All except 19 and 20
22. Exercises 12 and 18
23. Exercises 19 and 20

24. **TEST PREP** Here are graphs of three systems of equations. Which of the systems are consistent?

I. 

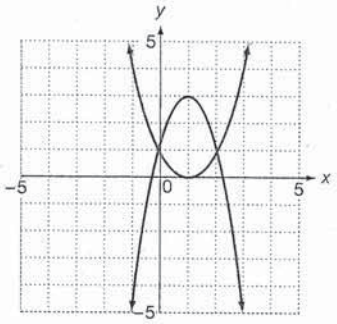
II. 

III. 

A. I only **B.** I and II **C.** I and III **D.** II and III

25. Estimate the solutions to the system of equations below by studying the graph at the right. Check your solutions using substitution in both equations.

$y = -2x^2 + 4x + 1$
$y = x^2 - 2x + 1$



26. ***Critical Thinking*** The solution of the following system is $(2, -3)$. Find A and B.

$Ax - 3y = 13$
$x - By = 8$

Challenge

27. Solve this system by graphing. What happens when you check your possible solution?

$3x + 7y = 5$
$6x - 7y = 1$

28. Find a system of equations with $(2, -4)$ as the solution.

29. Find an equation to go with $5x + 2y = 11$ so that the solution to the system of equations is $(3, -2)$.

Mixed Review

Find the slope and y-intercept. **30.** $x - y = 3$ **31.** $2x = y + 1$ *7-5*

Write an equation in slope-intercept form **32.** for the line with $m = -3$, y-intercept $= 2$ **33.** for the line that contains $(2, 4)$ and $(0, -2)$ *7-6*

Factor. **34.** $4a^2 - 14a - 18$ **35.** $y^3 + 2y^2 + 5y$ **36.** $16m^4 - 1$ *6-2, 6-5, 6-7*

Solve. **37.** $m^2 + 5m - 14 = 0$ **38.** $2x^2 - 9x - 5 = 0$ *6-8*

39. The difference of the squares of two consecutive odd positive integers is 40. Find the integers. *6-9*

Exercises

24. B
25. $(0, 1)$, $(2, 1)$
26. $A = 2$, $B = 2$
27. Noninteger solutions are difficult to approximate from graphs. Other methods are needed. $\left(\frac{2}{3}, \frac{3}{7}\right)$
28. Answers may vary.
29. Answers may vary.

Mixed Review

30. $m = 1, b = -3$
31. $m = 2, b = -1$
32. $y = -3x + 2$
33. $y = 3x - 2$
34. $2(a + 1)(2a - 9)$
35. $y(y^2 + 2y + 5)$
36. $(4m^2 + 1)(2m + 1)(2m - 1)$
37. $2, -7$
38. $5, -\frac{1}{2}$
39. 9 and 11

8-2 Exercises

Extra Help On the Web
Look for worked-out examples at the Prentice Hall Web site.
www.phschool.com

A

Solve using the substitution method.

1. $x + y = 4$
   $y = 2x + 1$
2. $x + y = 10$
   $y = x + 8$
3. $x = y - 1$
   $y = 4 - 2x$
4. $x = y + 6$
   $y = -2 - x$
5. $y = 2x - 5$
   $3y - x = 5$
6. $y = 2x + 1$
   $x + y = -2$
7. $x = -2y$
   $x = 2 - 4y$
8. $r = -3s$
   $r = 10 - 4s$
9. $x = 3y - 4$
   $2x - y = 7$
10. $s + t = -4$
    $s - t = 2$
11. $x - y = 6$
    $x + y = -2$
12. $y - 2x = -6$
    $2y - x = 5$
13. $x - y = 5$
    $x + 2y = 7$
14. $2x + 3y = -2$
    $2x - y = 9$
15. $x + 2y = 10$
    $3x + 4y = 8$
16. $x - y = -3$
    $2x + 3y = -6$
17. $3b + 2a = 2$
    $-2b + a = 8$
18. $r - 2s = 0$
    $4r - 3s = 15$
19. $y - 2x = 0$
    $3x + 7y = 17$
20. $x - 3y = 7$
    $-3x + 16y = 28$
21. $8x + 4y = 6$
    $4x = 3 - y$

Translate to a system of equations and solve.

22. The sum of two numbers is 27. One number is 3 more than the other. Find the numbers.
23. The sum of two numbers is 36. One number is 2 more than the other. Find the numbers.
24. Find two numbers whose sum is 58 and whose difference is 16.
25. Find two numbers whose sum is 66 and whose difference is 8.
26. The difference between two numbers is 16. Three times the larger number is seven times the smaller. What are the numbers?
27. The difference between two numbers is 18. The sum of twice the smaller number and three times the larger is 74. What are the numbers?

B

Solve each system of equations by using the substitution method and by graphing. Explain your results.

28. $3y + 3x = 14$
    $y = -x + 4$
29. $y = x + 5$
    $-3x + 3y = 15$
30. Determine whether $(2, -3)$ is a solution of this system of equations.
    $x + 3y = -7$ $\quad -x + y = -5$ $\quad 2x - y = 1$

Exercises

1. (1, 3)
2. (1, 9)
3. (1, 2)
4. (2, −4)
5. (4, 3)
6. (−1, −1)
7. (−2, 1)
8. (−30, 10)
9. (5, 3)
10. (−1, −3)
11. (2, −4)
12. $\left(\frac{17}{3}, \frac{16}{3}\right)$
13. $\left(\frac{17}{3}, \frac{2}{3}\right)$
14. $\left(\frac{25}{8}, \frac{-11}{4}\right)$
15. (−12, 11)
16. (−3, 0)
17. (4, −2)
18. (6, 3)
19. (1, 2)
20. (28, 7)
21. $\left(\frac{3}{4}, 0\right)$
22. 15, 12
23. 19, 17
24. 37, 21
25. 37, 29
26. 28, 12
27. 22, 4

3. PRACTICE/ASSESS

LESSON QUIZ

Solve by substitution.

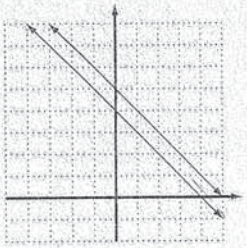
1. $y = 2x + 7$
   $2y - 5x = 11$
   (3, 13)
2. $-3x + y = 5$
   $5x + 2y = 21$
   (1, 8)

Assignment Guide

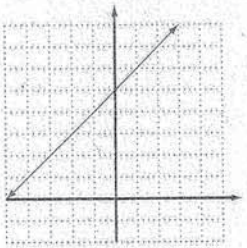
To provide flexible scheduling, tl
lesson can be split into parts.
Core 1–21, 28–30
Extension 31–35
Core 22–27

Use Mixed Review to maintain sk

28. Substitution yields 12 = 14. Sinc
equation is false for all values o
there are no solutions.



29. Substitution yields 15 = 15. Sinc
equation is true for all values o
there are infinitely many solutic



30. No

Practice Multiple Choice

Choose the best answer.

1. To solve this system of equations by using substitution, what substitution would you perform?

$4x + y = 9$
$x - 9y = 22$

A $9 + 4x$ for y
B $22 - 9y$ for x
C $9 - 4x$ for y
D $22 - x$ for y

2. Find the invalid step.

(1) $x = y$
(2) $x^2 = xy$
(3) $x^2 - y^2 = xy - y^2$
(4) $(x - y)(x + y) = y(x - y)$;
(5) $x + y = y$
(6) $y + y = y$
(7) $2y = 1y$
(8) $2 = 1$, which is not true.

F (2) multiply by x
G (4) factor both sides
H (5) divide by $(x - y)$
J (6) substitute x for y

31. ***Critical Thinking*** Here are two equivalent systems of equations. Find the values of A and B.

$x + 2y = 2$ $\qquad$ $Ax + 5y = -9$
$5x - 3y = -29$ $\qquad$ $x + By = 8$

32. ***Mathematical Reasoning*** Justify each step in the solution of the system of equations.

$x + y = 19$
$x = 5 + y$

Solution:
$5 + y + y = 19$ _____
$5 + 2y = 19$ _____
$2y = 14$ _____
$y = 7$ _____
$x = 5 + 7 = 12$ _____

Challenge

Here are systems of three equations in three variables. Use the substitution method to solve.

33.
$x + y + z = 4$
$x - 2y - z = 1$
$y = -1$

34.
$x + y + z = 180$
$x = z - 70$
$2y - z = 0$

35. Why is there no solution to the system at the right? (Hint: Use substitution more than once.)

$x + y = 10$
$y + z = 10$
$x + z = 10$
$x + y + z = 10$

Mixed Review

Determine whether the graphs of the equations are parallel. *7-8*

36.
$y = 2x - 9$
$y - 2x = 11$

37.
$6y - 21x = 3$
$8y - 5 = 28x$

38.
$4y + 9 = x$
$5 - 2y = 8x$

Factor. **39.** $9a^2 - 6ab + b^2$ **40.** $36y^4 - 25y^2$
41. $x^2 - 4xyz^2 + 4y^2z^4$ **42.** $9x^2 + 12xz^3 + 4z^6$ *6-2, 6-7*

Solve. **43.** $n^2 + 10n + 25 = 0$ **44.** $n^2 - 10n + 25 = 0$
45. $n^2 - 25 = 0$ **46.** $4n^2 - 49 = 0$ *6-8*

47. The perimeter of a rectangle is 350 cm. The width is 15 cm shorter than the length. What are the length and the width of this rectangle? *6-9*

48. If the sides of a square are lengthened by 8 in., the area becomes 169 in^2. Find the length of a side of the original square. *6-9*

1. C; Algebra 9.0
2. H; Algebra 25.2

Exercises

31. $A = 6$, $B = 4$
32. Substituting $5 + y$ for x in the first equation
Collecting like terms
Subtracting 5 from both sides
Dividing both sides by 2
Substituting 7 for y in the second equation
33. $(2, -1, 3)$
34. (30, 50, 100)
35. Answers may vary. For example: $x = 10 - z$ and $y = 10 - z$, so $(10 - z) + (10 - z) + z = 10$ or $z = 10$. $x = 10 - z$, so $x = 0$, and $y = 10 - z$, so $y = 0$. Then $x + y = 0$, but we know $x + y = 10$, so there is no solution.

Mixed Review

36. Yes
37. Yes
38. No
39. $(3a - b)^2$
40. $y^2(6y - 5)(6y + 5)$
41. $(x - 2yz^2)^2$
42. $(3x + 2z^3)^2$
43. -5
44. 5
45. 5, -5
46. $\frac{7}{2}$, $-\frac{7}{2}$
47. 95 cm, 80 cm
48. 5 in.

8-3 Exercises

Extra Help On the Web

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www.phschool.com

A

Solve using the addition method.

1. $x + y = 10$
   $x - y = 8$
2. $x - y = 7$
   $x + y = 3$
3. $x + y = 8$
   $-x + 2y = 7$
4. $x + y = 6$
   $-x + 3y = -2$
5. $3x - y = 9$
   $2x + y = 6$
6. $4x - y = 1$
   $3x + y = 13$
7. $4a + 3b = 7$
   $-4a + b = 5$
8. $7c + 5d = 18$
   $c - 5d = -2$
9. $8x - 5y = -9$
   $3x + 5y = -2$
10. $3a - 3b = -15$
    $-3a - 3b = -3$
11. $4x - 5y = 7$
    $-4x + 5y = 7$
12. $2x + 3y = 4$
    $-2x - 3y = -4$

Solve.

13. $-x - y = 8$
    $2x - y = -1$
14. $x + y = -7$
    $3x + y = -9$
15. $x + 3y = 19$
    $x - y = -1$
16. $3x - y = 8$
    $x + 2y = 5$
17. $x + y = 5$
    $5x - 3y = 17$
18. $x - y = 7$
    $4x - 5y = 25$
19. $2w + 3z = 17$
    $3w + 4z = 24$
20. $7p + 5q = 2$
    $8p - 9q = 17$
21. $2a + 3b = -1$
    $3a + 5b = -2$
22. $3x - 4y = 16$
    $5x + 6y = 14$
23. $x - 3y = 0$
    $5x - y = -14$
24. $5a - 2b = 0$
    $2a - 3b = -11$
25. $3x - 2y = 10$
    $5x + 3y = 4$
26. $2p + 5q = 9$
    $3p - 2q = 4$
27. $3x - 8y = 11$
    $x + 6y - 8 = 0$
28. $m - n = 32$
    $3m - 8n - 6 = 0$
29. $a + b = 12$
    $\frac{1}{2}a + \frac{1}{4}b = 4$
30. $2p - q = 8$
    $\frac{1}{3}p + \frac{1}{4}q = 3$

Translate to a system of equations and solve.

31. The sum of two numbers is 115. The difference is 21. Find the numbers.
32. The sum of two numbers is 26.4. One is five times the other. Find the numbers.
33. The sum of the length and width of a rectangle is 19 in. The length is one less than twice the width. Find the length and width of the rectangle.
34. The perimeter of a rectangle is 48 m. The width of the rectangle is 2 more than half the length. Find the length and the width.
35. Two angles are complementary. Their difference is 34°. Find the angles. (Complementary angles are angles whose sum is 90°.)
36. Two angles are complementary. One angle is 42° more than one half the other. Find the angles.

Exercises

1. (9, 1)
2. (5, −2)
3. (3, 5)
4. (5, 1)
5. (3, 0)
6. (2, 7)
7. $\left(\frac{-1}{2}, 3\right)$
8. $\left(2, \frac{4}{5}\right)$
9. $\left(-1, \frac{1}{5}\right)$
10. (−2, 3)
11. No solution
12. Infinitely many solutions
13. (−3, −5)
14. (−1, −6)
15. (4, 5)
16. (3, 1)
17. (4, 1)
18. (10, 3)
19. (4, 3)
20. (1, −1)
21. (1, −1)
22. (4, −1)
23. (−3, −1)
24. (2, 5)
25. (2, −2)
26. (2, 1)
27. $\left(5, \frac{1}{2}\right)$
28. (50, 18)
29. (4, 8)
30. (6, 4)
31. 68, 47
32. 22, 4.4
33. $\frac{37}{3}$ in., $\frac{20}{3}$ in.
34. $\frac{44}{3}$ m, $\frac{28}{3}$ m
35. 62°, 28°
36. 58°, 32°

3. PRACTICE/ASSES

LESSON QUIZ

1. Solve using the addition m
   $3x - 4y = 7$
   $2x + 4y = 8$
   $\left(3, \frac{1}{2}\right)$
2. Solve using the addition m
   $4x - 3y = 3$
   $8x + 5y = 50$
   $\left(\frac{15}{4}, 4\right)$

Assignment Guide

To provide flexible scheduli
lesson can be split into part
1 Core 1–12
2 Core 13–30, 37–42
Extension 43–48
3 Core 31–36

Use Mixed Review to maint

37. **TEST PREP** Which of the following ordered pairs are solutions of the system of equations?

$$2x - y = 10$$
$$6x - 3y = 30$$

I. $(0, -10)$ II. $(2, 6)$ III. $(5, 0)$ IV. $(-10, -30)$

A. I only
B. I and III only
C. I, III, and IV
D. I, II, III, and IV

B

Solve each system.

38. $3(x - y) = 9$
$x + y = 7$

39. $5(a - b) = 10$
$a + b = 2$

40. $2(x - y) = 3 + x$
$x = 3y + 4$

41. $2(5a - 5b) = 10$
$-5(6a + 2b) = 10$

42. $1.5x + 0.85y = 1637.5$
$0.01(x + y) = 15.25$

43. ***Critical Thinking*** Suppose we can get a system into the form

$$ax + by = c$$
$$dx + ey = f$$

where a, b, c, d, e, and f are any positive or negative rational numbers. Solve the system for x and y.

Challenge

Solve each system.

44. $y = ax + b$
$y = x + c$

45. $ax + by + c = 0$
$ax + cy + b = 0$

46. $3(7 - a) - 2(1 + 2b) + 5 = 0$
$3a + 2b - 18 = 0$

47. $\frac{2}{x} - \frac{3}{y} = -\frac{1}{2}$, and $\frac{1}{x} + \frac{2}{y} = \frac{11}{12}$

48. Use the pattern of your solution in Exercise 43 to solve the following system.

$$14x - 10y = 2600$$
$$24x + 20y = 520$$

Mixed Review

Determine whether the graphs of the equations are perpendicular. *7-8*

49. $8y - 3x = 10$
$-6y - 3x = 4$

50. $3x + 2y = 1$
$2x - 3y = 4$

51. $8x + y = 10$
$x - 8y = 0$

Solve by graphing. **52.** $x + 2y = 9$
$3y - x = 1$

53. $3x + 5y = -2$
$2y - 7x = 32$ *8-1*

Factor. **54.** $2m^3 - 4m^2 - m + 2$ **55.** $3y^2 - 12$ **56.** $x^2z - xz^2$ *6-7*

Simplify. **57.** $(a^2b + 2ab^2) - (3a^2b + ab^2)$

58. $(3y^2 - xy + 2x) + (5xy - 2y^2 + x)$ *5-7, 5-8*

Exercises

37. C
38. (5, 2)
39. (2, 0)
40. (1, −1)
41. (0, −1)
42. (525, 1000)
43. $x = \frac{ce - bf}{ae - bd}$, $y = \frac{af - cd}{ae - bd}$
44. $\left(\frac{b - c}{1 - a}, \frac{b - ac}{1 - a}\right)$
45. $\left(\frac{-b - c}{a}, 1\right)$
46. (4, 3)
47. (4, 3)
48. (110, −106)

Mixed Review

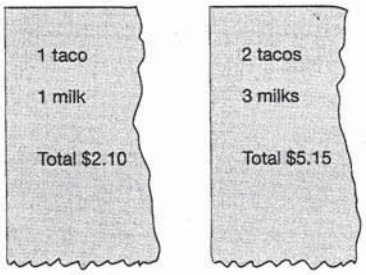
49. No
50. Yes
51. Yes
52. (5, 2)
53. (−4, 2)
54. $(2m^2 - 1)(m - 2)$
55. $3(y + 2)(y - 2)$
56. $xz(x - z)$
57. $-2a^2b + ab^2$
58. $y^2 + 4xy + 3x$

8-4 Exercises

A

Translate to a system of equations and solve.

1. ***Multi-Step Problem*** Marco has 150 coins, all nickels and dimes. He has 12 more dimes than nickels. How many nickels and how many dimes does he have?
   a. Let n be the number of nickels and d be the number of dimes. Write an equation that shows that the sum of the number of nickels and the number of dimes is 150.
   b. Which equation shows that there are 12 more dimes than nickels: $n + 12 = d$ or $d + 12 = n$?
   c. Show the system of equations that can be used to solve this problem.
   d. Solve the system of equations and answer the problem.
2. ***Multi-Step Problem*** Use the sales receipts at the right to find the cost of a taco and a glass of milk.
   a. Let t be the cost of a taco and m be the cost of a glass of milk. Write an expression that shows that the sum is \$2.10.



   b. Write an expression for the cost of two tacos.
   c. Write an expression for the cost of three glasses of milk.
   d. Write an equation that shows that the total cost for two tacos and three glasses of milk is \$5.15.
   e. Show the system of equations you can use to solve this problem.
   f. Solve the system of equations and answer the problem.
3. Four oranges and five apples cost \$3.56. Three oranges and four apples cost \$2.76. Find the cost of an orange and the cost of an apple.
4. Zelma is eighteen years older than her son. She was three times as old as he was one year ago. How old are they now?
5. Tyrone is twice as old as his daughter. In six years Tyrone's age will be three times what his daughter's age was six years ago. How old are they at present?
6. Frederique is two years older than her brother. Twelve years ago she was twice as old as he was. How old are they now?
7. The perimeter of a rectangle is 160 ft. One fourth the length is the same as twice the width. Find the dimensions of the rectangle.

Extra Help On the Web

Look for worked-out examples at the Prentice Hall Web site.
www.phschool.com

Exercises

1. a. $n + d = 150$
   b. $n + 12 = d$
   c. $n + d = 150$, $n + 12 = d$
   d. 69 nickels, 81 dimes
2. a. $t + m = \$2.10$
   b. $2t$
   c. $3m$
   d. $2t + 3m = \$5.15$
   e. $t + m = 2.1$, $2t + 3m = 5.15$
   f. milk \$.95, taco \$1.15
3. 44¢, 36¢
4. 28, 10
5. 48, 24
6. 16, 14
7. $71\frac{1}{9}$ ft, $8\frac{8}{9}$ ft

3. PRACTICE/ASSESS

LESSON QUIZ

1. A class has 31 students. Ther more boys than girls. How m are there?
   13
2. Together Lucas and Beverly l Beverly has \$1 more than tw much as Lucas has. How muc does Beverly have?
   \$35

Assignment Guide

▼ Core 1–19
Extension 20–22

Use Mixed Review to mainta

Practice Multiple Choice

Choose the best answer.

1. The band sells fruit to raise money. One student collected $226.74 for 6 boxes of grapefruit and 5 boxes of oranges. Another student collected $254.52 for 4 boxes of grapefruit and 9 boxes of oranges. How much do one box of grapefruit and one box of oranges cost together?

A $40.83

B $41.25

C $38.77

D $43.76

2. Which point below can be used as a counterexample to this statement:
If $x > 7$, then the point is on the line $4x + y = 81$.

F (1, 77)

G (8, 49)

H (9, 46)

J (10, 41)

8. On a fishing trip, Mariko caught twenty-four fish. She caught some rockfish averaging 2.5 lb. and some bluefish averaging 8 lb. The total weight of the fish was 137 lb. How many of each kind of fish did she catch?

9. Safety Rent-A-Truck rents a truck at a daily rate of $41.95 plus 29¢ per mile. City Rentals rents the same size truck for $38.95 plus 31¢ per mile. For what mileage is the cost the same?

10. Sunshine Truck Rentals rents a truck at a daily rate of $57.99 plus 48¢ per mile. City Rentals rents the same size truck at $58.95 plus 46¢ per mile. For what mileage is the cost the same?

11. Six apples and three oranges cost $3.36. Two apples and five oranges cost $3.04. Find the cost of an apple and the cost of an orange.

12. Susan wants to have business cards printed. One style will cost $25 plus 2 cents per card. Another style will cost $10 plus 5 cents per card. For how many cards will the cost be the same for both styles?

13. The Booster Club voted on where they would go for their annual trip. A majority of the club voted to go to a baseball game. They bought 29 tickets. Some of the tickets cost $21 each and some cost $27 each. The total cost of all the tickets was $675. How many tickets of each price did they buy?

TICKET INFORMATION	
Lower Box	$30.00
Upper Box	$27.00
Lower Reserved	$24.00
Upper Reserved	$21.00
General Admission	$15.50
General Admission (Children under 14 and senior citizens)	$10.50

14. Jermaine was in charge of buying milk for a class picnic for 32 students. Milk is sold in half-gallon cartons and gallon cartons at a neighborhood grocery store. The half-gallon carton costs $1.46 and the gallon carton costs $2.39. When he got to the store, there was not much milk left. Jermaine bought all 21 cartons they had and paid a total of $41.82. How many cartons of each size did he buy?

15. Lorena bought 10 packs of styrofoam cups for the graduation dance. A pack of fifty 12-oz cups costs $1.80 and a pack of fifty 16-oz cups costs $2.40. Lorena paid a total of $21.60 excluding tax. How many packs of each size cup did she buy?

16. The Taylor family reunion had a record turnout of 38 people last year. For a change of pace, they decided to go ice skating instead of having a picnic. Admission for the group cost $179.50 (including skates). How many adults and how many children were at the reunion?

ICELAND SKATING RINK	
Admission:	
ADULTS	$3.75
CHILDREN	$2.50
Admission and skate rental:	
ADULTS	$5.25
CHILDREN	$4.00

1. A; Algebra 9.0
2. H; Algebra 24.3

Exercises

8. 10 rock, 14 blue
9. 150 mi
10. 48 mi
11. $0.32, $0.48
12. 500 cards
13. 18 $21 tickets, 11 $27 tickets
14. 9 $\frac{1}{2}$-gal, 12 gal
15. 4 12-oz, 6 16-oz
16. 22 adults, 16 children

B

17. In Lewis Carroll's *Through the Looking Glass,* Tweedledum says to Tweedledee, "The sum of your weight and twice mine is 361 pounds." Then Tweedledee says to Tweedledum, "Contrariwise, the sum of your weight and twice mine is 362 pounds." Find the weight of Tweedledum and Tweedledee.

18. During a publicity campaign, a cycle shop gave away 5000 miniature cycles and bumper stickers. The cycles cost 63¢ each and the bumper stickers cost 52¢ each. The cycle shop spent $2798 on the gifts. How many of each gift did they buy?

19. Fenton Rent-A-Truck charges $32.85 plus 49¢ per mile for a certain truck. Handy Truck Rents charges $31.95 plus 48¢ per mile for the same truck. For what mileage is the cost the same?

20. ***Write a Convincing Argument*** Solve the problem below. Then write an argument that would convince a classmate that your solution is correct.

Several ancient Chinese books include problems that can be solved by translating to systems of equations. *Arithmetical Rules in Nine Sections* was compiled by Chang Tsang, a Chinese mathematician who died in 152 B.C. One of the problems is: Suppose there are a number of rabbits and pheasants confined in a cage. In all there are 35 heads and 94 feet. How many rabbits and how many pheasants are there?

Challenge

21. Daniel earned $288 on his investments. He invested $1100 at one yearly rate and $1800 at a rate that was 1.5% higher. Find the two rates of interest.

22. Together, a bat, a ball, and a glove cost $99.00. The bat costs $9.95 more than the ball, and the glove costs $65.45 more than the bat. How much does each cost?

Mixed Review

Graph the lines containing these points and find their slope.

23. $(2, 5), (-3, 10)$ **24.** $(-1, -1), (2, 5)$ **25.** $(4, -7), (2, 3)$ *7-1, 7-4*

26. Write an equation for the line that contains $(-2, 2)$ and $(3, 7)$. *7-5*

27. Write an equation for the line with $m = 6$, y-intercept $= 7$. *7-5*

Simplify. **28.** $\frac{x^6}{x^2}$ **29.** $\frac{t^9}{t^8}$ **30.** $\frac{n^4}{n^4}$ **31.** $\frac{x^3y^5}{x^3y^4}$ *5-1*

Factor. **32.** $7m^4n^2 - 7m^2n^4$ **33.** $81x^2 - 126xy + 49y^2$ *6-7*

Self-Test On the Web

Check your progress. Look for a self-test at the Prentice Hall Web site.
www.phschool.com

Exercises

17. 120, 121
18. 3200 bumper stickers, 1800 cycles
19. No solution
20. 12 rabbits, 23 pheasants
21. $1100x + 1800(x + 0.015) = 288$; 9%, 10.5%
22. glove $79.95, bat $14.50, ball $4.55

Mixed Review

23. -1
24. 2
25. -5
26. $y = x + 4$
27. $y = 6x + 7$
28. x^4
29. t
30. 1
31. y
32. $7m^2n^2(m + n)(m - n)$
33. $(9x - 7y)^2$

We solve this equation for t.

$$30t + 60t = 150$$
$$90t = 150$$
$$t = \frac{5}{3}, \text{ or } 1\frac{2}{3} \text{ hours}$$

In $1\frac{2}{3}$ hours the cars will be 150 miles apart.

Try This Solve.

c. Two cars leave town at the same time in opposite directions. One travels 35 km/h and the other 40 km/h. In how many hours will they be 200 km apart?

d. Two cars leave town at the same time in the same direction. One travels 35 mi/h and the other 40 mi/h. In how many hours will they be 15 miles apart?

8-5 Exercises

Extra Help On the Web

Look for worked-out examples at the Prentice Hall Web site.
www.phschool.com

A

Solve.

1. ***Multi-Step Problem*** Two cars leave town at the same time going in opposite directions. One travels 55 mi/h and the other travels 48 mi/h. In how many hours will they be 206 miles apart?

   a. Draw a diagram that represents the situation. Label your diagram using data from the problem.

   b. Copy and complete the missing information in the table below.

	Distance	Rate	Time
Slow Car	distance of slow car		
Fast Car	distance of fast car		

   c. Use the data in your table to write an equation.

   d. Solve the equation and answer the question.

2. ***Multi-Step Problem*** Two cars leave town at the same time going in the same direction on the same road. One travels 30 mi/h and the other travels 46 mi/h. In how many hours will they be 72 miles apart?

   a. Draw a diagram that represents the situation. Label your diagram using data from the problem.

3. PRACTICE/ASSESS

LESSON QUIZ

1. Two cars leave town, travelin opposite directions. The first travels at 50 miles per hour a second car travels at 60 miles How long will it take them to miles apart?
   $\frac{10}{11}$ hours

2. You have a choice of two typi services. The Type-Fast Compa type research papers for $10 p per page. The Type-It-Well Co will type research papers for 75¢ per page. For how many the cost the same?
   20 pages

Assignment Guide

▼ Core 1–18
Extension 19–21

Use Mixed Review to maintain

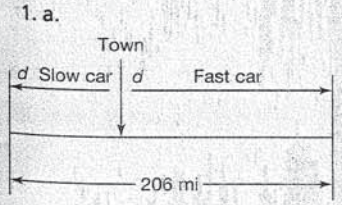
Try This

c. $35t + 40t = 200$, $t = 2\frac{2}{3}$ h

d. $d = 35t$, $d + 15 = 40t$, $t = 3$ h

Exercises

1. a.



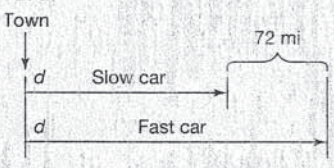
b.

48	t	
55	t	

c. $48t + 55t = 206$

d. $t = 2$; in 2 hours they will be 206 miles apart.

2. a.



b.

	30	t
$d + 72$		t

c. $d = 30t$
$d + 72 = 46t$

d. $t = 4.5$; in 4.5 hours they will be 72 miles apart.

b. Copy and complete the missing information in the table below.

	Distance	Rate	Time
Slow Car	d		
Fast Car		46	

c. Use the data in your table to write a system of equations.

d. Solve the system of equations and answer the question.

3. ***Multi-Step Problem*** A train leaves a station and travels east at 72 km/h. Three hours later a second train leaves on a parallel track and travels east at 120 km/h. When will it overtake the first train?

a. Draw a diagram that represents the situation. Label your diagram using data from the problem.

b. Copy and complete the missing information in the table below.

	Distance	Rate	Time
1st train		72	
2nd train	d		t

c. Use the data in your table to write a system of equations.

d. Solve the system of equations and answer the question.

4. Two cars leave town at the same time going in opposite directions. One travels 44 mi/h and the other travels 55 mi/h. In how many hours will they be 297 miles apart?

5. Two cars leave town at the same time going in the same direction on the same road. One travels 32 mi/h and the other travels 47 mi/h. In how many hours will they be 69 miles apart?

6. A private airplane leaves an airport and flies due south at 192 km/h. Two hours later a jet leaves the same airport and flies due south at 960 km/h. When will the jet overtake the plane?

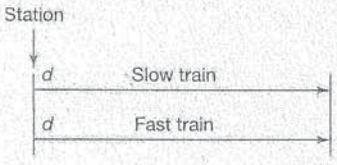
7. A canoeist paddled for 4 hours with a 6-km/h current to reach a campsite. The return trip against the same current took 10 hours. Find the speed of the canoe in still water.

8. An airplane flew for 4 hours with a 20-km/h tail wind. The return flight against the same wind took 5 hours. Find the speed of the plane in still air.

9. It takes a passenger train 2 hours less time than it takes a freight train to make the trip from Central City to Clear Creek. The passenger train averages 96 km/h while the freight train averages 64 km/h. How far is it from Central City to Clear Creek?

Exercises

3. a.



b.

d		$t + 3$
	120	

c. $d = 72(t + 3)$
$d = 120t$

d. $t = 4.5$; 4.5 hours after the second train leaves, the second train will overtake the first train.

4. 3 h
5. 4.6 h
6. $\frac{1}{2}$ hour after jet leaves
7. 14 km/h
8. 180 km/h
9. 384 km

10. It takes a small jet plane 4 hours less time than it takes a propeller-driven plane to travel from Glen Rock to Oakville. The jet plane averages 637 km/h while the propeller plane averages 273 km/h. How far is it from Glen Rock to Oakville?

11. An airplane took 2 hours to fly 600 km against a head wind. The return trip with the wind took $1\frac{2}{3}$ hours. Find the speed of the plane in still air.

12. It took 3 hours to row a boat 18 km against the current. The return trip with the current took $1\frac{1}{2}$ hours. Find the speed of the rowboat in still water.

13. A motorcycle breaks down and the rider has to walk the rest of the way to work. The motorcycle was traveling at 45 mi/h, and the rider walks at a speed of 6 mi/h. The distance from home to work is 25 miles, and the total time for the trip was 2 hours. How far did the motorcycle go before it broke down?

14. A student walks and jogs to college each day. The student averages 5 km/h walking and 9 km/h jogging. The distance from home to college is 8 km, and the student makes the trip in 1 hour. How far does the student jog?

B

15. An airplane flew for 4.23 hours with a 25.5-km/h tail wind. The return flight against the same wind took 4.97 hours. Find the speed of the plane in still air.

16. An airplane took 2.5 hours to fly 625 miles with the wind. It took 4 hours and 10 minutes to make the return trip against the same wind. Find the wind speed and the speed of the plane in still air.

17. To deliver a package, a messenger must travel at a speed of 60 mi/h on land and then use a motorboat whose speed is 20 mi/h in still water. The messenger goes by land to a dock and then travels on a river against a current of 4 mi/h. He reaches the destination in 4.5 hours and then returns to the starting point in 3.5 hours. How far did the messenger travel by land and how far by water?

18. Against a head wind, Jeff computes his flight time for a trip of 2900 miles at 5 hours. The flight would take 4 hours and 50 minutes if the head wind were half as much. Find the head wind and the plane's air speed.

19. ***Write a Convincing Argument*** Solve the problem below. Then write an argument that would convince a classmate that your solution is correct.

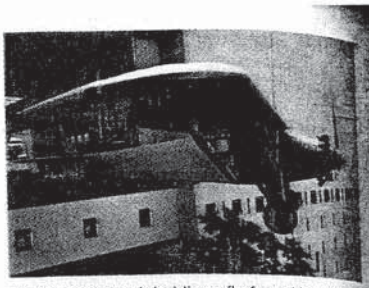
    A truck and a car leave a service station at the same time and travel on the same road in the same direction. The truck travels at 55 mi/h and the car at 40 mi/h. They can maintain CB radio contact within a range of 10 miles. When will they lose contact?

Exercises

10. 1911 km
11. 330 km/h
12. 9 km/h
13. 15 mi
14. $6\frac{3}{4}$ km
15. $\approx$ 317.03 km/h
16. 50 mi/h, 200 mi/h
17. 90 mi, 48 mi
18. 40 mi/h, 620 mi/h
19. After 40 min

Challenge

20. In 1927 Charles Lindbergh flew the *Spirit of St. Louis* from New York to Paris at an average speed of 107.4 mi/h. Eleven years later, Howard Hughes flew the same route, averaged 217.1 mi/h, and took 16 hours, 57 minutes less time. Find the length of their route.



Today commercial airlines fly from New York to Paris in about 7 hours. Use the answer to Exercise 20 to find their average speed.

21. During normal traffic it takes Ingrid 24 minutes to travel the 18 miles from her house to the train station. However, during rush hour (5:30–8:30 A.M.) Ingrid can only travel 12 miles in the same length of time. It then takes at least 5 minutes to get onto a train, 30 minutes to get to her destination, and 5 minutes to get to her office. If trains leave every 15 minutes starting at 6:00 A.M., when does Ingrid have to leave her house in order to get to her office by 8:00 A.M.?

Mixed Review

Mental Math Is the given ordered pair a solution of the system of equations? **22.** $(6, 1)$; $4y - x = -2$, $x - 7y = 2$ **23.** $(2, 5)$; $y - 4x = -3$, $2x - y = -1$ *8-1*

Solve. **24.** $x^2 - 3x = 4$ **25.** $y^2 - 7y - 18 = 0$ *8-8*

Simplify. **26.** $\frac{x^4y^7}{xy^3}$ **27.** $\frac{a^9b^8}{a^4b^2}$ **28.** $\left(\frac{q^3s^5}{qs^2}\right)^3$ **29.** $\frac{x^{12}y^3z^5}{x^3yz^3}$ *5-1, 5-2*

Error Analysis

Each exercise has an error commonly made by algebra students. Can you find and correct the error?

1.
$$\begin{array}{r} 3x - y = 4 \\ 2x + y = 16 \\ \hline 5x \quad\; = 20 \\ x = 4 \end{array}$$

$$\begin{array}{l} 3x - y = 4 \\ 3(4) - y = 4 \\ y = 4 - 12 \\ y = -8 \end{array}$$

The solution is $(4, -8)$.

2.
$$\begin{array}{r} 4x - y = 17 \\ -x - y = 7 \\ \hline 3x = 24 \\ x = 8 \end{array}$$

$$\begin{array}{l} 4(8) - y = 17 \\ 32 - y = 17 \\ -y = -15 \\ y = 15 \end{array}$$

The solution is $(8, 15)$.

Exercises

20. ≈ 3603 mi
Photo caption: about 515 mi/h
21. 6:34 A.M.

Mixed Review

22. No
23. Yes
24. 4, −1
25. 9, −2
26. x^3y^4
27. a^5b^6
28. q^6s^9
29. $x^9y^2z^2$

Error Analysis

1. The next to the last equation should be $-y = 4 - 12$. The solution is (4, 8).
2. The second equation should be subtracted from the first to get $5x = 10$. The solution is (2, −9).

'ICE/ASSESS

z

ɔn of nickels and dimes is dollars (4000 cents). There ɔins. How many are there of ?

, 200 nickels

nt Guide
·17
on 18–22

l Review to maintain skills.

Extra Help On the Web

Look for worked-out examples at the Prentice Hall Web site.
www.phschool.com

Franklin Delano Roosevelt was paralyzed in both legs after he contracted polio in 1921. He was elected to four terms as President of the United States, serving from 1933 to his death in 1945. He has been honored on U.S. dimes since 1946.

8-6 Exercises

A

1. The sum of the digits of a two-digit number is 9. If the digits are reversed, the new number if 63 greater than the original number. Find the original number.
2. The sum of the digits of a two-digit number is 10. When the digits are reversed, the new number is 36 more than the original number. Find the original number.
3. The sum of the digits of a two-digit number is 12. If the digits are reversed, the new number is 18 less than the original number. Find the original number.
4. The sum of the digits of a two-digit number if 16. If the digits are reversed, the new number is 18 less than the original number. Find the original number.
5. A jar of dimes and quarters contains $15.25. There are 103 coins in all. How many of each are there?
6. A jar of quarters and nickels contains $1.25. There are 13 coins in all. How many of each are there?
7. A vending machine takes only nickels and dimes. There are 5 times as many dimes as nickels in the machine. The face value of the coins is $4.40. How many of each coin are in the machine?
8. A vending machine takes only nickels and dimes. At the end of the day there were three times as many nickels as dimes and a total of $25. How many of each coin were in the machine?
9. There were 429 people at a play. Admission was $1 for adults and 75¢ for children. The receipts were $372.50. How many adults and how many children attended the play?
10. The attendance at a school concert was 578. Admission cost $2.00 for adults and $1.50 for children. The receipts were $985.00. How many adults and how many children attended the concert?
11. There were 200 tickets sold for a college basketball game. Tickets were $4.50 for students and $9 for adults. The total amount collected was $1485. How many of each type of ticket were sold?
12. There were 203 tickets sold for a school wrestling match. For those who held activity cards, the price was $2.50. For those who did not hold activity cards, the price was $4.00. The total amount collected was $620. How many of each type of ticket were sold?
13. A jar contains 5-gram bolts and 10-gram bolts. The contents of the jar weigh 2.35 kg (1000 g = 1 kg). If there are 300 bolts altogether, how many are there of each kind?
14. A jar contains 5-gram bolts and 10-gram bolts. The contents of the jar weigh 3.8 kg. If there are 460 bolts, how many are there of each kind?

Exercises

1. 18
2. 37
3. 75
4. 97
5. 70 dimes, 33 quarters
6. 3 quarters, 10 nickels
7. 8 nickels, 40 dimes
8. 300 nickels, 100 dimes
9. 226 children, 203 adults
10. 342 children, 236 adults
11. 130 adults, 70 students
12. 128 at $2.50, 75 at $4.00
13. 130 5-g bolts, 170 10-g bolts
14. 160 5-g bolts, 300 10-g bolts

B

15. The sum of the digits of a two-digit number is 14. If the number represented by reversing the digits is subtracted from the original number, the result is 18. What is the original number?
16. If 27 is added to a two-digit number, the result is a number with the same digits, but in reverse order. The sum of the digits is 11. What is the original number?
17. A two-digit number is 6 times the sum of its digits. The tens digit is 1 more than the units digit. Find the number.
18. ***Write a Convincing Argument*** Solve the problem below. Then write an argument to convince a classmate that your solution is correct.

    The sum of three digits is 5. The first and last digits are the same. If the middle digit is exchanged with the first digit, the new number is 90 less than the original number. Find the original number.

Challenge

19. A three-digit number is 28 times the sum of its digits. The units digit is twice the tens digit and 3 more than the hundreds digit. Find the number.
20. Find all possible combinations of quarters and dimes that will total $2.20. What is the smallest number of coins?
21. Laurel went to the bank to get $20 worth of dimes and quarters. The teller made a mistake, interchanging the number of dimes and quarters Laurel asked for. How many dimes and how many quarters had she asked for if the teller gave her $9 too much?
22. Glenda wrote a check to pay for a radio. She accidentally transposed the numbers. The store sent her a refund for $36. She knew that the check was less than $100 and was a whole dollar amount. What are the possible amounts that the radio could have cost?

Mixed Review

Factor. **23.** $16a^8 - 36$ **24.** $8x^3 + 10x^2 - 6x$ **25.** $c^2 - 5c$ **26.** $y^2 - 10y + 25$ **27.** $45m^2 - 106m + 45$ **28.** $2t^3 - 2t^2 - 4t$ *6-2, 6-5*

Solve. **29.** $c^2 + 4c = 0$ **30.** $a^2 - 7a = -12$ **31.** $x^2 + 3x = 10$

Simplify. **32.** $\frac{x^4y^7}{x^2y^5}$ **33.** $\frac{x^9y^5z^4}{x^6y^2z}$ **34.** $\left(\frac{a^3b^7c}{a^3b}\right)^3$ *5-1, 5-2*

Multiply. **35.** $(x + 1)^2$ **36.** $(x - 3)^2$ **37.** $(a + 7)^2$ **38.** $(r + 3)(r - 3)$ **39.** $(2a + 4)(a - 5)$ **40.** $(m - 4)^2$ *5-10*

Solve each system. **41.** $3x + y = 5$, $x + 2y = 0$ **42.** $2x + 3y = -2$, $3x + 2y = 7$ *8-1, 8-2, 8-3*

Practice Multiple Choice

Choose the best answer.

1. A journeyman painter can do a job by himself in 6 hours. His apprentice takes 8 hours to do the same job. How many hours will it take if they work together?

   A 7 h
   B $3\frac{3}{7}$ h
   C 14 h
   D $3\frac{1}{14}$ h

2. Chuck is 4 miles from home. It takes him 1 hour to walk part of the way at 3 mi/h and jog the rest of the way at 5 mi/h. How far does he walk?

   F 2 mi
   G $\frac{1}{2}$ mi
   H $1\frac{1}{2}$ mi
   J 1 mi

1. B; Algebra 15.0
2. H; Algebra 15.0

Exercises

15. 86
16. 47
17. 54
18. 212
19. 336
20. Possible combinations of quarters and dimes: 8, 2; 6, 7; 4, 12; 2, 17; 0, 22; smallest number is 10.
21. 100 dimes, 40 quarters
22. $15, $26, $37, $48, $59

Mixed Review

23. $4(2a^4 + 3)(2a^4 - 3)$
24. $2x(4x^2 + 5x - 3)$
25. $c(c - 5)$
26. $(y - 5)^2$
27. $(5m - 9)(9m - 5)$
28. $2t(t + 1)(t - 2)$
29. 0, −4
30. 3, 4
31. 2, −5
32. x^2y^2
33. $x^3y^3z^3$
34. $b^{18}c^3$
35. $x^2 + 2x + 1$
36. $x^2 - 6x + 9$
37. $a^2 + 14a + 49$
38. $r^2 - 9$
39. $2a^2 - 6a - 20$
40. $m^2 - 8m + 16$
41. $x = 2, y = -1$
42. $x = 5, y = -4$

8 Chapter Wrap Up

8-1

A **solution** of a **system of equations** in two variables is an ordered pair that makes both equations true.

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

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

Solve by graphing.

5. $x + y = 4$, $x - y = 8$
6. $x + 3y = 12$, $2x - 4y = 4$
7. $2x + y = 1$, $x = 2y + 8$
8. $3x - 2y = -4$, $2y - 3x = -2$

Key Terms

addition method (p. 367)
consistent system of equations (p. 360)
dependent system of equations (p. 360)
inconsistent system of equations (p. 360)
linear combination (p. 368)
solution of a system of equations (p. 358)
substitution method (p. 362)
system of equations (p. 358)

8-2

To solve a system of equations without graphing, you can use the **substitution method.** First solve one of the equations for a variable. Then substitute for that variable in the other equation.

Solve using the substitution method.

9. $y = 5 - x$, $3x - 4y = -20$
10. $x + 2y = 6$, $2x + 3y = 8$
11. $3x + y = 1$, $x = 2y + 5$
12. $x + y = 6$, $y = 3 - 2x$
13. $s + t = 5$, $s = 13 - 3t$
14. $x - y = 4$, $y = 2 - x$

Translate to a system of equations and solve.

15. The sum of two numbers is 30. Their difference is 40. Find the numbers.

8-3

The **addition method** can be used to solve a system of equations that are both in standard form $Ax + By = C$. Multiply one or both equations to make a pair of terms additive inverses. Then add the two equations and solve for the variable. Substitute for that variable in either of the original equations and solve for the second variable.

Chapter 8 Wrap Up

1. No
2. Yes
3. Yes
4. No
5. (6, −2)
6. (6, 2)
7. (2, −3)
8. No solution; lines are parallel
9. (0, 5)
10. (−2, 4)
11. (1, −2)
12. (−3, 9)
13. (1, 4)
14. (3, −1)
15. (35, −5)

Internet Activity On the Web

Look for extension problems for this chapter at the Prentice Hall Web site.
www.phschool.com

Solve using the addition method.

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

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

18. $x - y = 8$
$2x + y = 7$

19. $2x + 3y = -5$
$3x - y = -13$

20. $2x + 3y = 8$
$5x + 2y = -2$

21. $5x - 2y = 2$
$3x - 7y = 36$

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

23. $6x + 2y = 4$
$10x + 7y = -8$

Translate to a system of equations and solve.

24. The sum of two numbers is 27. One half of the first number plus one third of the second number is 11. Find the numbers.

8-4

Sometimes it is easier to use two variables when translating a word problem. Then you must find a system of two equations to solve in order to find the solution to the problem.

Translate to a system of equations and solve.

25. Roberta is 25 years older than her daughter, Cindy. In four years, Roberta will be twice as old as Cindy. How old are they now?

26. The perimeter of a rectangle is 76 cm. The length is 17 cm more than the width. Find the length and the width.

8-5

Use the formula, $d = r \cdot t$, to solve motion problems. *Drawing a diagram* and *making a table* may help you *write the equation.*

Translate to a system of equations and solve.

27. An airplane flew for 4 hours with a 15 mi/h tail wind. The return flight against the same wind took 5 hours. Find the speed of the airplane in still air.

8-6

A two-digit number can be written in the form $10x + y$. If the digits are reversed, the new number is $10y + x$. To solve coin problems, you can write one equation for the **number** of coins, and a second equation for the **value** of the coins.

28. The sum of the digits of a two-digit number is 6. When the digits are reversed, the new number is 36 more than the original number. Find the original number.

29. A collection of dimes and quarters is worth $25. There are 40 more dimes than quarters. How many of each are there?

Chapter 8 Wrap Up

16. (3, 1)
17. (1, 4)
18. (5, −3)
19. (−4, 1)
20. (−2, 4)
21. (−2, −6)
22. (3, 2)
23. (2, −4)
24. (12, 15)
25. Roberta 46, Cindy 21
26. length = 27.5 cm, width = 10.5 cm
27. 135 mi/h
28. 15
29. 60 quarters, 100 dimes

8 Chapter Assessment

Determine whether the given ordered pair is a solution of the system of equations.

1. $(4, 2)$; $x - y = 2$, $x + y = 6$

2. $(-8, -7)$; $x - 2y = 6$, $2x - 3y = 5$

Solve by graphing.

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

4. $x + 2y = 6$, $2x - 3y = 26$

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

6. $x = y - 1$, $3y = -2x - 2$

Solve using the substitution method.

7. $y = 6 - x$, $2x - 3y = 22$

8. $x + 2y = 5$, $x + y = 2$

9. $x + y = 31$, $x - y = 17$

10. $7x + y = 10$, $2y + 5x = 11$

Solve using the addition method.

11. $x - y = 6$, $3x + y = -2$

12. $3x - 4y = 7$, $x + 4y = 5$

13. $4x + 5y = 5$, $6x + 7y = 7$

14. $2x + 3y = 13$, $3x - 5y = 10$

15. $x + y = 4$, $2x + 3y = 7$

16. $8x - 10y = 2$, $7x - 5y = 13$

Translate to a system of equations and solve.

17. A motorboat traveled for 2 hours with an 8 km/h current. The return trip against the same current took 3 hours. Find the speed of the motorboat in still water.

18. The sum of two numbers is 8. Their difference is 12. Find the numbers.

19. A collection of dimes and quarters totals \$3.55. There are 25 coins in all. How many quarters are there?

20. Tickets to a junior high school play cost \$1.10 for each adult and \$0.40 for each child. If 360 tickets were sold for a total of \$282.60, how many tickets of each kind were sold?

21. One train leaves a station heading due west. Two hours later a second train leaves the same station heading due east. The second train is traveling 15 mi/h faster than the first. Six hours after the second train leaves, the two trains are 580 miles apart. Find the rate at which each train is traveling.

Assessment Item Analysis

Item	Lesson
1–6	8-1
7–10	8-2
11–16	8-3
17	8-5
18	8-2
19, 20	8-6
21	8-5

Chapter 8 Assessment

1. Yes
2. Yes
3. (4, 1)
4. (10, −2)
5. (4, 0)
6. (−1, 0)
7. (8, −2)
8. (−1, 3)
9. (24, 7)
10. (1, 3)
11. (1, −5)
12. $\left(3, \frac{1}{2}\right)$
13. (0, 1)
14. (5, 1)
15. (5, −1)
16. (4, 3)
17. 40 km/h
18. 10 and −2
19. 7
20. 198 adult tickets, 162 child tickets
21. 35 mi/h, 50 mi/h