

Practice and Problem Solving

Assignment Guide

Objective

- A B Core 1-17, 64-65
- C Extension 66

Objective

- A B Core 18-63
- C Extension 67-69

Standardized Test Prep 70-75

Mixed Review 76-84

Enrichment 3-2

Teaching 3-2

Practice 3-2

**Practice 3-2** Solving Systems Algebraically

**Solve each system by elimination.**

- $\begin{cases} x + y = 10 \\ x - y = 2 \end{cases}$
- $\begin{cases} x + 3y = -1 \\ x - 2y = 2 \end{cases}$
- $\begin{cases} x + y = 7 \\ x + 3y = 11 \end{cases}$
- $\begin{cases} x + y = 2 \\ x - 2y = -10 \end{cases}$
- $\begin{cases} x + 2y = 10 \\ 3x - y = 18 \end{cases}$
- $\begin{cases} 2x - 5y = 11 \\ 4x + 3y = 18 \end{cases}$
- $\begin{cases} x + 3y = -4 \\ x - y = 17 \end{cases}$
- $\begin{cases} x + y = 2 \\ x - 2y = 8 \end{cases}$

**Solve each system by substitution. Check your answers.**

- $\begin{cases} x = -1 \\ 2x + y = 7 \end{cases}$
- $\begin{cases} x + y = 7 \\ 3x - y = 6 \end{cases}$
- $\begin{cases} y = 2x + 3 \\ 5x - y = -3 \end{cases}$
- $\begin{cases} x + 2y = -33 \\ 2x - y = 7 \end{cases}$
- $\begin{cases} 4x - 8y = 22 \\ 3x - 2y = 10 \end{cases}$
- $\begin{cases} 4x - 8y = 22 \\ 3x - 2y = 10 \end{cases}$
- $\begin{cases} x + 2y = -4 \\ 3x - 2y = 10 \end{cases}$
- $\begin{cases} 3x - 2y = 10 \\ 2x - y = 4 \end{cases}$
- $\begin{cases} x + 2y = 9 \\ x - y = 3 \end{cases}$
- $\begin{cases} 2x - 3y = 4 \\ x = -4 \end{cases}$

**Solve each system.**

- $\begin{cases} x = -3 \\ 5x + y = 9 \end{cases}$
- $\begin{cases} 5x + 4y = 2 \\ -4x - 2y = 4 \end{cases}$
- $\begin{cases} x = 2x + 3 \\ 5x - y = -3 \end{cases}$
- $\begin{cases} x + 2y = 10 \\ x - 3y = 11 \end{cases}$
- $\begin{cases} x + 2y = 10 \\ x - 3y = 11 \end{cases}$
- $\begin{cases} 0.3x + 0.4y = 0.8 \\ 0.1x - 0.09y = -0.8 \end{cases}$
- $\begin{cases} 2x + 3y = 10 \\ x - 3y = 11 \end{cases}$
- $\begin{cases} 2x + 3y = 10 \\ x - 3y = 11 \end{cases}$
- $\begin{cases} 2x + 3y = 10 \\ x - 3y = 11 \end{cases}$
- $\begin{cases} 2x + 3y = 10 \\ x - 3y = 11 \end{cases}$

**A** Practice by Example

Solve each system by substitution. Check your answers.

**Example 1** (page 123)

1.  $\begin{cases} 4x + 2y = 7 \\ y = 5x \end{cases}$  (0.5, 2.5)

2.  $\begin{cases} 3c + 2d = 2 \\ d = 4 \end{cases}$  (c, d) = (-2, 4)

3.  $\begin{cases} x + 12y = 68 \\ x = 8y - 12 \end{cases}$  (20, 4)

4.  $\begin{cases} 4p + 2q = 8 \\ q = 2p + 1 \end{cases}$  (p, q) = (0.75, 2.5)

5.  $\begin{cases} x + 3y = 7 \\ 2x - 4y = 24 \end{cases}$  (10, -1)

6.  $\begin{cases} x + 6y = 2 \\ 5x + 4y = 36 \end{cases}$  (8, -1)

7.  $\begin{cases} 3a + b = 3 \\ 2a - 5b = -15 \end{cases}$  (a, b) = (0, 3)

8.  $\begin{cases} t = 2r + 3 \\ 5r - 4t = 6 \end{cases}$  (r, t) = (-6, -9)

9.  $\begin{cases} y = 2x - 1 \\ 3x - y = -1 \end{cases}$  (-2, -5)

10.  $\begin{cases} 2m + 4n = 10 \\ 3m + 5n = 11 \end{cases}$  (m, n) = (-3, 4)

11.  $\begin{cases} -6 = 3x - 6y \\ 4x = 4 + 5y \end{cases}$  (6, 4)

12.  $\begin{cases} r + s = -12 \\ 2r - 3s = 6 \end{cases}$  (r, s) = (-6, -6)

**Example 2** (page 124)

13a.  $\begin{cases} d = 0.50m \\ d = 15 \end{cases}$

15a.  $\begin{cases} p = 28 \\ p = 8 + 0.35d \end{cases}$

**Example 3** (page 124)

Solve each system by elimination.

18.  $\begin{cases} x + y = 12 \\ x - y = 2 \end{cases}$  (7, 5)

19.  $\begin{cases} x + 2y = 10 \\ x + y = 6 \end{cases}$  (2, 4)

20.  $\begin{cases} 3a + 4b = -1 \\ -3a - 2b = -1 \end{cases}$  (a, b) = (-1, 0)

21.  $\begin{cases} 4x + 2y = 4 \\ 6x + 2y = 8 \end{cases}$  (2, -2)

22.  $\begin{cases} 2w + 5y = -24 \\ 3w - 5y = 14 \end{cases}$  (w, y) = (-2, -4)

23.  $\begin{cases} 3u + 3v = -1 \\ -2u + 3v = 4 \end{cases}$  (u, v) = (4, -1)

24.  $\begin{cases} x + 3y = 11 \\ x + 4y = 14 \end{cases}$  (2, 3)

25.  $\begin{cases} 5x + 3y = 30 \\ 3x + 3y = 18 \end{cases}$  (6, 0)

26.  $\begin{cases} x - 14 = -y \\ x - y = 2 \end{cases}$

27.  $\begin{cases} 3x + 2y = 6 \\ 3x + 3y = 9 \end{cases}$  (0, 3)

28.  $\begin{cases} 5x - y = 4 \\ 2x - y = 1 \end{cases}$  (1, 1)

29.  $\begin{cases} 2r + s = 3 \\ 4r - s = 9 \end{cases}$  (r, s) = (2, -1)

13. **Fund-Raising** Suppose you have signed up for a bike-a-thon to raise money for charity. One person is sponsoring you at a rate of \$.50 per mile. Each of the other sponsors plans to donate \$15 no matter how far you bike.
- Write a system of equations to model the donation  $d$  for  $m$  miles biked.
  - For how many miles will all sponsors donate the same amount? **30 miles**
14. **Transportation** A youth group with 26 members is going skiing. Each of the five chaperones will drive a van or a sedan. The vans can seat seven people, and the sedans can seat five people. How many of each type of vehicle could transport all 31 people to the ski area in one trip? **3 vans and 2 sedans, or 4 vans and 1 sedan, or 5 vans and 0 sedans**
15. Suppose you have a part-time job delivering packages. Your employer pays you at a flat rate of \$7 per hour. You discover that a competitor pays employees \$2 per hour plus \$.35 per delivery.
- Write a system of equations to model the pay  $p$  for  $d$  deliveries. Assume a four-hour shift.
  - How many deliveries would the competitor's employees have to make in four hours to earn the same pay you earn in a four-hour shift? **58**
16. A boat can travel 24 mi in 3 h when traveling with a current. Against the current, it can travel only 16 mi in 4 h. Find the rate of the current and the rate of the boat in still water. **2 mi/h, 6 mi/h**
17. **Geometry** The measure of one acute angle of a right triangle is  $30^\circ$  more than twice the measure of the other acute angle. Find the measures of the angles.  **$20^\circ, 70^\circ, 90^\circ$**

pages 126-128 Exercises

- 30.  $\{(x, y) : -2x + 3y = 13\}$
- 31.  $\{(a, d) \mid -3a + d = -1\}$
- 32.  $(a, b) = (3, 2)$

- 33. no solution
- 34. (5, 4)
- 35. no solution

- 36.  $(\frac{20}{17}, \frac{19}{17})$
- 37. (-3, 2)
- 38. (r, s) = (4, 1)

- 39. (1, 3)
- 40. no solution
- 41. (m, n) = (1, -4)

## Examples 4, 5 (page 125)

Solve each system by elimination. 30–41. See margin p. 126.

30.  $\begin{cases} 4x - 6y = -26 \\ -2x + 3y = 13 \end{cases}$

31.  $\begin{cases} 9a - 3d = 3 \\ -3a + d = -1 \end{cases}$

32.  $\begin{cases} 2a + 3b = 12 \\ 5a - b = 13 \end{cases}$

33.  $\begin{cases} 2x - 3y = 6 \\ 6x - 9y = 9 \end{cases}$

34.  $\begin{cases} 20x + 5y = 120 \\ 10x + 7.5y = 80 \end{cases}$

35.  $\begin{cases} 6x - 2y = 11 \\ -9x + 3y = 16 \end{cases}$

36.  $\begin{cases} 2x - 3y = -1 \\ 3x + 4y = 8 \end{cases}$

37.  $\begin{cases} 5x - 2y = -19 \\ 2x + 3y = 0 \end{cases}$

38.  $\begin{cases} r + 3s = 7 \\ 2r - s = 7 \end{cases}$

39.  $\begin{cases} y = 4 - x \\ 3x + y = 6 \end{cases}$

40.  $\begin{cases} 3x + 2y = 10 \\ 6x + 4y = 15 \end{cases}$

41.  $\begin{cases} 3m + 4n = -13 \\ 5m + 6n = -19 \end{cases}$

### Reading Math

For help with reading and solving Exercise 42, see p. 129.

42. **Elections** In a mayoral election, the incumbent received 25% more votes than the opponent. Altogether, 5175 votes were cast for the two candidates. How many votes did the incumbent mayor receive? **2875 votes**

43. **Writing** Explain how you decide whether to use substitution or elimination to solve a system. **See margin.**

### B Apply Your Skills

1.  $(m, n) = (4, -3)$

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

3.  $(t, v) = (50, 750)$

4.  $(0.5, 0.75)$

5.  $(\frac{3}{11}, -\frac{2}{11})$

Solve each system.

44.  $\begin{cases} 5x + y = 0 \\ 5x + 2y = 30 \end{cases}$  **(-6, 30)**

45.  $\begin{cases} 2m = -4n - 4 \\ 3m + 5n = -3 \end{cases}$

46.  $\begin{cases} 7x + 2y = -8 \\ 8y = 4x \end{cases}$

47.  $\begin{cases} y = 9t + 300 \\ v = 7t + 400 \end{cases}$

48.  $\begin{cases} 80x + 60y = 85 \\ 100x - 40y = 20 \end{cases}$

49.  $\begin{cases} 2x + 3y = 0 \\ 7x = 3(2y) + 3 \end{cases}$

50.  $\begin{cases} \frac{x}{3} + \frac{4y}{3} = 300 \\ 3x - 4y = 300 \end{cases}$   
**(300, 150)**

51.  $\begin{cases} 0.02a - 1.5b = 4 \\ 0.5b - 0.02a = 1.8 \end{cases}$   
**(a, b) = (-235, -5.8)**

52.  $\begin{cases} 4y = 2x \\ 2x + y = \frac{x}{2} + 1 \end{cases}$   
**(0.5, 0.25)**

53.  $\begin{cases} -x + y = 4 \\ 3x - y = 6 \end{cases}$   
**(5, 9)**

54.  $\begin{cases} \frac{1}{2}x + y = 7 \\ 2x - 3y = 7 \end{cases}$   
**(8, 3)**

55.  $\begin{cases} 0.4x + 0.1y = 0.6 \\ 0.5x - 0.3y = -0.1 \end{cases}$   
**(1, 2)**

For each system, choose the method of solving that seems easier to use.

Explain why you made each choice. 56–61. See margin.

56.  $\begin{cases} 3x - 5y = 26 \\ -2x - 3y = -11 \end{cases}$  **(7, -2)**

57.  $\begin{cases} y = \frac{2}{3}x - 3 \\ -x + 3y = 18 \end{cases}$  **(27, 15)**

58.  $\begin{cases} 2m + 3n = 12 \\ -5m + n = -13 \end{cases}$

59.  $\begin{cases} 3x - y = 5 \\ y = 4x + 2 \end{cases}$

60.  $\begin{cases} 2x - 3y = 4 \\ 2x - 5y = -6 \end{cases}$  **(9.5, 5)**

61.  $\begin{cases} 6x - 3y = 3 \\ 5x - 5y = 10 \end{cases}$

62. **Open-Ended** Write a system of equations in which both equations must be multiplied by a nonzero number before using elimination. Solve your system. **See margin p. 128.**
63. **Critical Thinking** Give an example of a system of equations that would be easier to solve graphically than algebraically. **See margin p. 128.**

64. **Internet Access** The ads at the left show the costs of Internet access for two companies. **a–d. See margin p. 128.**

- Write a system of equations to represent the cost  $c$  for  $t$  hours of access in one month for each company.
- Graph the system from part (a). Label each line.
- For how many hours of use will the costs for the companies be the same? How is this information represented on the graph?
- If you use the Internet about 20 hours each month, which company should you choose? Explain how you reached an answer.

In determining whether to use substitution or elimination to solve an equation, look at the equations to determine if one is solved or can be

easily solved for a particular variable. If that is the case, substitution can easily be used. Otherwise, elimination might be easier.

56. Elimination; substitution would be difficult since no coefficient is 1.

57. Substitution; the first equation is solved for  $y$ .

### Lesson Quiz 3-2

- Solve by substitution.  $\begin{cases} -2x + 5y = -2 \\ x - 3y = 3 \end{cases}$   
**(-9, -4)**
- A bookstore took in \$16 on the sale of 5 copies of a new cookbook and 3 copies of a new novel. The next day it took in \$89 on the sale of 3 copies of the cookbook and 1 copy of novel. What was the price of each book?  
**cookbook: \$25; novel: \$16**

Solve each system.

3.  $\begin{cases} 10x + 6y = 0 \\ -7x + 2y = 31 \end{cases}$   
**(-3, 5)**

4.  $\begin{cases} 7x + 5y = 18 \\ -7x - 9y = 4 \end{cases}$   
**(6.5, -5.5)**

5.  $\begin{cases} -3x + y = 6 \\ 6x - 2y = 25 \end{cases}$   
**no solutions**

### Alternative Assessment

Ask three students each to solve a different equation in standard form. Write the equations on a board so all students can see them. Instruct half of the students to solve the system by finding  $x$  first. Instruct the other half to find  $y$  first. Have the students compare solutions.

58. Substitution; the second equation is easily solved for  $n$ .

59. Substitution; the second equation is solved for  $n$ .

60. Elimination;  $2x$  would be eliminated from the system if the equations were subtracted.

61. Elimination; substitution would be difficult since coefficient is 1.

A sheet of blank grids is available in the FCAT Daily Practice and Strategies Transparencies booklet. Give this sheet to students for practice with filling in the grids.

## Resources

For additional practice with a variety of test item formats: FCAT Practice, p. 161  
FCAT Strategies, p. 156  
FCAT Daily Practice and Strategies Transparencies

## Pages 126–128 Exercises

62. Answers may vary.

Sample:

$$\begin{cases} -3x + 4y = 12 \\ 5x - 3y = 13 \end{cases}$$

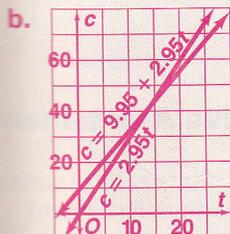
(8, 9)

63. Answers may vary.

Sample:

$$\begin{cases} y = 2x + 1 \\ y = -3x - 4 \end{cases}$$

64a.  $c = 9.95 + 2.25t$ ,  
 $c = 2.95t$



c. 14.2 h; It is where the graphs intersect.

d. Answers may vary. Sample: Internet Action, because it would cost \$4.05 less per month

79.  $y = (x + 3) - 4$  or  
 $y = x - 1$

80.  $y = |x - 2| + \frac{1}{2}$

81.  $y = 2(x - 1) - 4$  or  
 $y = 2x - 6$

82.  $y = |x + 3| + 6$

65. **Break-Even Point** A theater production costs \$40,000 plus \$2800 per performance. A sold-out performance brings in \$3675. How many sold-out performances will the production need to break even? **46 performances**

**Challenge** 66. **Weather** The equation  $F = \frac{9}{5}C + 32$  relates temperatures on the Celsius and Fahrenheit scales. Does any temperature have the same number reading on both scales? If so, what is the number? **yes; for  $-40$  degrees**

Find the value of  $a$  that makes each system a dependent system.

67.  $\begin{cases} y = 3x + a \\ 3x - y = 2 \end{cases}$  **-2**      68.  $\begin{cases} 3y = 2x \\ 6y - a - 4x = 0 \end{cases}$  **0**      69.  $\begin{cases} y = \frac{x}{2} + 4 \\ 2y - x = a \end{cases}$  **8**

# FCAT Practice

## Gridded Response

Use the following system of equations for Exercises 70–73.

$$\begin{cases} 5x - 3y = 11 \\ -x + 12y = 3.5 \end{cases}$$

70. If you want to solve the system by eliminating the  $x$  terms (with addition), by what would you multiply the second equation? **5**

71. If you want to solve the system by eliminating the  $y$  terms (with addition), by what would you multiply the first equation? **4**

72. What is the value of  $x$  in the solution? Enter your answer as a decimal.

73. What is the value of  $y$  in the solution? Enter your answer as a decimal.



**FCAT Online**

FCAT Format quiz at  
[www.PHSchool.com](http://www.PHSchool.com)  
Web Code: aga-0302

Use the following system of equations for Exercises 74–75.

$$\begin{cases} 4x - 10y = -3 \\ 12x + 5y = 12 \end{cases}$$

74. What is the value of  $x$  in the solution? Enter your answer as a fraction in simplest form.  **$\frac{3}{4}$**

75. What is the value of  $y$  in the solution? Enter your answer as a decimal.

## Mixed Review

### Lesson 3-1

Solve each system of equations by graphing.

76.  $\begin{cases} y = 3x + 4 \\ 2y = 6x - 2 \end{cases}$   
**no solution**

77.  $\begin{cases} -3y = 9x + 1 \\ 6y = -18x - 2 \end{cases}$   
 **$\{(x, y) \mid -9x - 3y = 1\}$  no solution**

78.  $\begin{cases} 4x - y = 1 \\ -8x + 2y = 2 \end{cases}$

### Lesson 2-6

Write an equation for each diagonal translation. **79–82. See margin.**

79.  $y = x$ , 4 units down, 3 units left

80.  $y = |x|$ ,  $\frac{1}{2}$  unit up, 2 units right

81.  $y = 2x - 3$ , 1 unit down, 1 unit right

82.  $y = |x| + 2$ , 4 units up, 2 units right

### Lesson 1-1

83. What subset(s) of real numbers contain(s) 6? **natural, whole, integer, rational**

84. The sum of the first and last of four consecutive odd integers is 48. What are the four integers? **21, 23, 25, 27**