

EXERCISES

For more exercises, see *Extra Skill and Word Problem Practice*.

Practice and Problem Solving

A Practice by Example



Example 1
(page 125)

Solve each system by substitution. Check your answers.

1. $\begin{cases} 4x + 2y = 7 \\ y = 5x \end{cases}$

2. $\begin{cases} 3c + 2d = 2 \\ d = 4 \end{cases}$

3. $\begin{cases} x + 12y = 68 \\ x = 8y - 12 \end{cases}$

4. $\begin{cases} 4p + 2q = 8 \\ q = 2p + 1 \end{cases}$

5. $\begin{cases} x + 3y = 7 \\ 2x - 4y = 24 \end{cases}$

6. $\begin{cases} x + 6y = 2 \\ 5x + 4y = 36 \end{cases}$

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

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

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

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

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

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

Example 2
(page 126)

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?

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?

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?

16. A boat can travel 24 mi in 3 h when traveling with a current. Against the same 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.

17. Geometry The measure of one acute angle of a right triangle is 30° more than twice the measure of the other acute angle. Find the measures of the angles.

Example 3
(page 126)

Solve each system by elimination.

18. $\begin{cases} x + y = 12 \\ x - y = 2 \end{cases}$

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

20. $\begin{cases} 3a + 4b = 9 \\ -3a - 2b = -3 \end{cases}$

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

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

23. $\begin{cases} 3u + 3v = 15 \\ -2u + 3v = -5 \end{cases}$

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

25. $\begin{cases} 5x + 3y = 30 \\ 3x + 3y = 18 \end{cases}$

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

27. $\begin{cases} 3x + 2y = 6 \\ 3x + 3 = y \end{cases}$

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

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

Examples 4, 5
(page 127)

Solve each system by elimination.

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

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

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

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

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

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

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

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

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


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


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

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

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For a guide to solving Exercise 42, see p. 131.

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

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

B Apply Your Skills

Solve each system.

$$44. \begin{cases} 5x + y = 0 \\ 5x + 2y = 30 \end{cases}$$

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

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

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

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

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

$$50. \begin{cases} \frac{x}{3} + \frac{4y}{3} = 300 \\ 3x - 4y = 300 \end{cases}$$

$$51. \begin{cases} 0.02a - 1.5b = 4 \\ 0.5b - 0.02a = 1.8 \end{cases}$$

$$52. \begin{cases} 4y = 2x \\ 2x + y = \frac{x}{2} + 1 \end{cases}$$

- 53. Multiple Choice** The equation $3x - 4y = 2$ and which equation below form a system with no solutions?

(A) $2y = 1.5x - 2$

(B) $2y = 1.5x - 1$

(C) $3x + 4y = 2$

(D) $4y - 3x = -2$

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

Explain why you made each choice.

$$54. \begin{cases} 3x - 5y = 26 \\ -2x - 3y = -11 \end{cases}$$

$$55. \begin{cases} y = \frac{2}{3}x - 3 \\ -x + 3y = 18 \end{cases}$$


$$56. \begin{cases} 2m + 3n = 12 \\ -5m + n = -13 \end{cases}$$

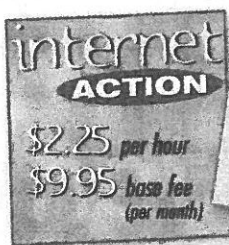
$$57. \begin{cases} 3x - y = 5 \\ y = 4x + 2 \end{cases}$$

$$58. \begin{cases} 2x - 3y = 4 \\ 2x - 5y = -6 \end{cases}$$

$$59. \begin{cases} 6x - 3y = 3 \\ 5x - 5y = 10 \end{cases}$$

- 60. Open-Ended** Write a system of equations in which both equations must be multiplied by a nonzero number before using elimination. Solve your system.

-  **61. Internet Access** The ads at the left show the costs of Internet access for two companies.



- 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.

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