



Lesson Check

Do you know HOW?

Solve each system by graphing.

1. $y = x + 7$
 $y = 2x + 1$

2. $y = \frac{1}{2}x + 6$
 $y = x - 2$

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

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

5. **Concert Tickets** Tickets for a concert cost \$10 each if you order them online, but you must pay a service charge of \$8 per order. The tickets are \$12 each if you buy them at the door on the night of the concert.

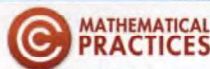
- a. Write a system of equations to model the situation. Let c be the total cost. Let t be the number of tickets.
b. Graph the equations and find the intersection point. What does this point represent?

Do you UNDERSTAND? MATHEMATICAL PRACTICES

6. **Vocabulary** Match each type of system with the number of solutions the system has.
A. inconsistent
B. consistent and dependent
C. consistent and independent
I. exactly one
II. infinitely many
III. no solution
7. **Writing** Suppose you graph a system of linear equations. If a point is on only one of the lines, is it a solution of the system? Explain.
8. **Reasoning** Can a system of two linear equations have exactly two solutions? Explain.
9. **Reasoning** Suppose you find that two linear equations are true when $x = -2$ and $y = 3$. What can you conclude about the graphs of the equations? Explain.



Practice and Problem-Solving Exercises



A Practice

Solve each system by graphing. Check your solution.

10. $y = 2x$
 $y = -2x + 8$

11. $y = \frac{1}{2}x + 7$
 $y = \frac{3}{2}x + 3$

12. $y = \frac{1}{3}x + 1$
 $y = -3x + 11$

13. $y = x - 4$
 $y = -x$

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

15. $4x - y = -1$
 $-x + y = x - 5$

16. $y = -\frac{1}{2}x + 2$
 $y = \frac{1}{2}x + 6$

17. $2x - y = -5$
 $-2x - y = -1$

18. $x = -3$
 $y = 5$

See Problem 1.

19. **Student Statistics** The number of right-handed students in a mathematics class is nine times the number of left-handed students. The total number of students in the class is 30. How many right-handed students are in the class? How many left-handed students are in the class?

See Problem 2.

20. **Plants** A plant nursery is growing a tree that is 3 ft tall and grows at an average rate of 1 ft per year. Another tree at the nursery is 4 ft tall and grows at an average rate of 0.5 ft per year. After how many years will the trees be the same height?
21. **Fitness** At a local fitness center, members pay a \$20 membership fee and \$3 for each aerobics class. Nonmembers pay \$5 for each aerobics class. For what number of aerobics classes will the cost for members and nonmembers be the same?

Solve each system by graphing. Tell whether the system has *one solution*, *infinitely many solutions*, or *no solution*.

➡ See Problem 3.

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

23. $y = 2x - 1$
 $3y = 6x - 5$

24. $3x + y = 2$
 $4y = 12 - 12x$

25. $2x - 2y = 5$
 $y = x - 4$

26. $y = 2x - 2$
 $2y = 4x - 4$

27. $y - x = 5$
 $3y = 3x + 15$

28. $2x + 2y = 4$
 $12 - 3x = 3y$

29. $2y = x - 2$
 $3y = \frac{3}{2}x - 3$

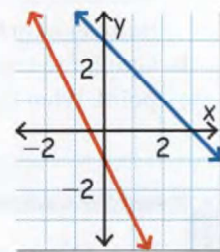
30. $3x - y = 2$
 $4y = -x + 5$

B Apply

31. **Think About a Plan** You are looking for an after-school job. One job pays \$9 per hour. Another pays \$12 per hour, but you must buy a uniform that costs \$39. After how many hours of work would your net earnings from either job be the same?

- What equations can you write to model the situation?
- How will graphing the equations help you solve the problem?

32. **Error Analysis** A student graphs the system $y = -x + 3$ and $y = -2x - 1$ as shown at the right. The student concludes there is no solution. Describe and correct the student's error.



33. **Reasoning** Suppose you graph a system of linear equations and the intersection point appears to be $(3, 7)$. Can you be sure that the ordered pair $(3, 7)$ is the solution? What must you do to be sure?

34. **Cell Phone Plans** A cell phone provider offers a plan that costs \$40 per month plus \$.20 per text message sent or received. A comparable plan costs \$60 per month but offers unlimited text messaging.

- How many text messages would you have to send or receive in order for the plans to cost the same each month?
- If you send or receive an average of 50 text messages each month, which plan would you choose? Why?

Without graphing, decide whether each system has *one solution*, *infinitely many solutions*, or *no solution*. Justify your answer.

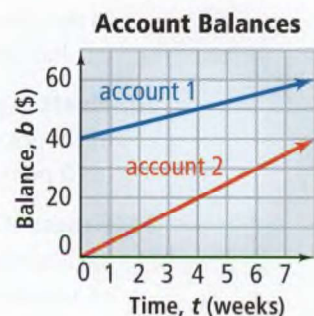
35. $y = x - 4$
 $y = x - 3$

36. $x - y = -\frac{1}{2}$
 $2x - 2y = -1$

37. $y = 5x - 1$
 $10x = 2y + 2$

38. $3x + 2y = 1$
 $4y = 6x + 2$

39. **Banking** The graph at the right shows the balances in two bank accounts over time. Use the graph to write a system of equations giving the amount in each account over time. Let t = the time in weeks and let b = the balance in dollars. If the accounts continue to grow as shown, when will they have the same balance?



40. **Open-Ended** One equation in a system is $y = \frac{1}{2}x - 2$.
- Write a second equation so that the system has one solution.
 - Write a second equation so that the system has no solution.
 - Write a second equation so that the system has infinitely many solutions.