Name _____ Class _____ Date _____

Practice 7-1

Solving Systems by Graphing

Solve by graphing. Write *no solution* or *infinitely many solutions* where appropriate.

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

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

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

4. $y = 4x + 7$
$y = -3x$

5. $y = x - 3$
$y = \frac{1}{7}x + 3$

6. $y = -3x - 4$
$3x + y = -4$

7. $y = -x - 3$
$y = -2x - 8$

8. $y = -x + 2$
$3x + 3y = 12$

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

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

11. $y = \frac{5}{3}x - 4$
$y = 2x - 6$

12. $y = 3x + 2$
$2x + y = -8$

13. $x = y + 4$
$y = x + 4$

14. $x + y = 2$
$y = -2x - 1$

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

16. $3x - 6y = 12$
$2x - 4y = 8$

17. $x - y = 1$
$y = \frac{3}{4}x + 1$

18. $y = x$
$x = 2y + 2$

19. $3x - y = 9$
$y = x + 1$

20. $2x + y = 0$
$y = 2x - 4$

21. $y = 2x - 6$
$x + y = 9$

22. $y = -x$
$y = 3x + 12$

23. $4x + y = 6$
$y = -4x - 1$

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

25. $y = x$
$2x + y = \frac{3}{2}$

26. $3x + y = 6$
$2x - y = \frac{3}{2}$

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

28. $x - y = -\frac{3}{2}$
$-2x + 5y = -4.5$

Solve each system by using a graphing calculator. Write *no solution* or *infinitely many solutions* where appropriate.

29. $y = x + 6$
$y = 2x - 7$

30. $y = \frac{7}{2}x - 6$
$y = 3x - 2$

31. $y = 2x - 20$
$y = -x + 34$

32. $y = \frac{2}{3}x + 4$
$2x - 3y = 3$

33. $y = -x - 5$
$y = 3x - 105$

34. $x + y = -10$
$2x + 3y = -30$

35. $3x - 4y = 0$
$2x + y = 110$

36. $y = \frac{1}{7}x + 10$
$x - 2y = 0$

37. $2x + y = 6$
$3y = -6x + 9$

38. $y = \frac{5}{6}x + 12$
$y = \frac{4}{3}x - 6$

39. $2x - y = 8$
$3x - 2y = 0$

40. $x + 2y = 2$
$3x + 4y = 22$

41. $y = 2x + 0.75$
$y = -4x - 8.25$

42. $1.25x + 3.25y = -5.75$
$0.5x - 1.5y = 0.5$

43. $x = -2y - 3.5$
$-5x + 3y = -15$

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Practice 7-2

Solving Systems Using Substitution

Solve each system using substitution. Write *no solution* or *infinitely many solutions* where appropriate.

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

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

3. $y = 3x - 10$
$y = 2x - 5$

4. $x = -2y + 1$
$x = y - 5$

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

6. $y = x - 3$
$y = -3x + 25$

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

8. $y = 3x - 6$
$-3x + y = -6$

9. $x + 2y = 200$
$x = y + 50$

10. $3x + y = 10$
$y = -3x + 4$

11. $y = 2x + 7$
$y = 5x + 4$

12. $3x - 2y = 0$
$x + y = -5$

13. $4x + 2y = 8$
$y = -2x + 4$

14. $6x - 3y = 6$
$y = 2x + 5$

15. $2x + 4y = -6$
$x - 3y = 7$

16. $5x - 3y = -4$
$x + y = -4$

17. $y = -\frac{2}{3}x + 4$
$2x + 3y = -6$

18. $2x + 3y = 8$
$\frac{3}{2}y = 4 - x$

19. $3x - y = 4$
$2x + y = 16$

20. $x + y = 0$
$x = y + 4$

21. $5x + 2y = 6$
$y = -\frac{5}{2}x + 1$

22. $2x + 5y = -6$
$4x + y = -12$

23. $4x + 3y = -3$
$2x + y = -1$

24. $y = -\frac{2}{3}x + 1$
$4x + 6y = 6$

25. $5x - 6y = 19$
$4x + 3y = 10$

26. $2x + y = 6.6$
$5x - 2y = 0.3$

27. $2x - 4y = 3.8$
$3x - y = 17.7$

28. $3x + 4y = 8$
$4.5x + 6y = 12$

29. $3x - 4y = -5$
$x = y + 2$

30. $y = \frac{1}{3}x + 10$
$x = 3y + 6$

31. $2x + 5y = 62$
$3x - y = 23.3$

32. $-5x + y = 6$
$2x - 3y = 60$

33. $x = \frac{3}{4}y - 6$
$y = \frac{4}{3}x + 8$

34. $5x + 6y = -76$
$x + 2y = -44$

35. $3x - 2y = 10$
$y = \frac{3}{2}x - 1$

36. $-3x + 2y = -6$
$-2x + y = 6$

37. At an ice cream parlor, ice cream cones cost \$1.10 and sundaes cost \$2.35. One day, the receipts for a total of 172 cones and sundaes were \$294.20. How many cones were sold?

38. You purchase 8 gal of paint and 3 brushes for \$152.50. The next day, you purchase 6 gal of paint and 2 brushes for \$113.00. How much does each gallon of paint and each brush cost?

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Practice 7-3

Solving Systems Using Elimination

Solve by elimination. Show your work.

1. $x + 2y = 7$
$3x - 2y = -3$

2. $3x + y = 20$
$x + y = 12$

3. $5x + 7y = 77$
$5x + 3y = 53$

4. $2x + 5y = -1$
$x + 2y = 0$

5. $3x + 6y = 6$
$2x - 3y = 4$

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

7. $9x - 3y = 24$
$7x - 3y = 20$

8. $2x + 7y = 5$
$2x + 3y = 9$

9. $x + y = 30$
$x - y = 6$

10. $4x - y = 6$
$3x + 2y = 21$

11. $x + 2y = 9$
$3x + 2y = 7$

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

13. $2x - 3y = -11$
$3x + 2y = 29$

14. $8x - 9y = 19$
$4x + y = -7$

15. $2x + 6y = 0$
$-2x - 5y = 0$

16. $-2x + 3y = -9$
$x + 3y = 3$

17. $4x - 3y = 11$
$3x - 5y = -11$

18. $3x + 7y = 48$
$5x - 7y = -32$

19. $-2x + 3y = 25$
$-2x + 6y = 58$

20. $3x + 8y = 81$
$5x - 6y = -39$

21. $8x + 13y = 179$
$2x - 13y = -69$

22. $-x + 8y = -32$
$3x - y = 27$

23. $2x + 7y = -7$
$5x + 7y = 14$

24. $x + 6y = 48$
$-x + y = 8$

25. $6x + 3y = 0$
$-3x + 3y = 9$

26. $7x + 3y = 25$
$-2x - y = -8$

27. $3x - 8y = 32$
$-x + 8y = -16$

28. $4x - 7y = -15$
$-4x - 3y = -15$

29. $5x + 7y = -1$
$4x - 2y = 22$

30. $6x - 3y = 69$
$7x - 3y = 76$

31. $x + 8y = 28$
$-3x + 5y = 3$

32. $8x - 6y = -122$
$-4x + 6y = 94$

33. $2x + 9y = 36$
$2x - y = 16$

34. $-6x + 12y = 120$
$5x - 6y = -48$

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

36. $10x - 4y = 6$
$10x + 3y = 13$

37. $6x + 3y = 27$
$-4x + 7y = 27$

38. $6x - 8y = 40$
$5x + 8y = 48$

39. $3x + y = 27$
$-3x + 4y = -42$

40. $2x + 8y = -42$
$-x + 8y = -63$

41. $5x + 9y = 112$
$3x - 2y = 8$

42. $-3x + 2y = 0$
$-3x + 5y = 9$

43. $8x - 2y = 58$
$6x - 2y = 40$

44. $7x - 9y = -57$
$-7x + 10y = 68$

45. $9x + 3y = 2$
$-9x - y = 0$

46. Shopping at Savers Mart, Lisa buys her children four shirts and three pairs of pants for $85.50. She returns the next day and buys three shirts and five pairs of pants for $115.00. What is the price of each shirt and each pair of pants?

47. Grandma's Bakery sells single-crust apple pies for $6.99 and double-crust cherry pies for $10.99. The total number of pies sold on a busy Friday was 36. If the amount collected for all the pies that day was $331.64, how many of each type were sold?

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Practice 7-4

Applications of Linear Systems

Use a system of linear equations to solve each problem.

1. Your teacher is giving you a test worth 100 points containing 40 questions. There are two-point and four-point questions on the test. How many of each type of question are on the test?

2. Suppose you are starting an office-cleaning service. You have spent $315 on equipment. To clean an office, you use $4 worth of supplies. You charge $25 per office. How many offices must you clean to break even?

3. The math club and the science club had fundraisers to buy supplies for a hospice. The math club spent $135 buying six cases of juice and one case of bottled water. The science club spent $110 buying four cases of juice and two cases of bottled water. How much did a case of juice cost? How much did a case of bottled water cost?

4. On a canoe trip, Rita paddled upstream (against the current) at an average speed of 2 mi/h relative to the riverbank. On the return trip downstream (with the current), her average speed was 3 mi/h. Find Rita's paddling speed in still water and the speed of the river's current.

5. Kay spends 250 min/wk exercising. Her ratio of time spent on aerobics to time spent on weight training is 3 to 2. How many minutes per week does she spend on aerobics? How many minutes per week does she spend on weight training?

6. Suppose you invest $1500 in equipment to put pictures on T-shirts. You buy each T-shirt for $3. After you have placed the picture on a shirt, you sell it for $20. How many T-shirts must you sell to break even?

7. A light plane flew from its home base to an airport 255 miles away. With a head wind, the trip took 1.7 hours. The return trip with a tail wind took 1.5 hours. Find the average airspeed of the plane and the average windspeed.

8. Suppose you bought supplies for a party. Three rolls of streamers and 15 party hats cost $30. Later, you bought 2 rolls of streamers and 4 party hats for $11. How much did each roll of streamers cost? How much did each party hat cost?

9. A new parking lot has spaces for 450 cars. The ratio of spaces for full-sized cars to compact cars is 11 to 4. How many spaces are for full-sized cars? How many spaces are for compact cars?

10. While on vacation, Kevin went for a swim in a nearby lake. Swimming against the current, it took him 8 minutes to swim 200 meters. Swimming back to shore with the current took half as long. Find Kevin's average swimming speed and the speed of the lake's current.

Name _____ Class _____ Date _____

Practice 7-5

Linear Inequalities

Graph each linear inequality.

1. $y \geq -4$
2. $x + y < -2$
3. $y < x$
4. $x > 2$
5. $4x + y > -6$
6. $-3x + y \leq -3$
7. $x + 4y \leq 8$
8. $y > 2x + 6$
9. $y > -x + 2$
10. $2x + 3y < -9$
11. $y \leq \frac{3}{7}x + 2$
12. $4x + 2y < -8$
13. $y \leq \frac{3}{4}x + 1$
14. $x - y > 4$
15. $y \geq -\frac{2}{5}x - 2$

16. Suppose your class is raising money for the Red Cross. You make \$5 on each basket of fruit and \$3 on each box of cheese that you sell. How many items of each type must you sell to raise more than \$150?

    a. Write a linear inequality that describes the situation.

    b. Graph the inequality.

    c. Write two possible solutions to the problem.

17. Suppose you intend to spend no more than \$60 buying books. Hardback books cost \$12 and paperbacks cost \$5. How many books of each type can you buy?

    a. Write a linear inequality that describes the situation.

    b. Graph the inequality.

    c. Write two possible solutions to the problem.

18. Suppose that for your exercise program, you either walk 5 mi/d or ride your bicycle 10 mi/d. How many days will it take you to cover a distance of at least 150 mi?

    a. Write a linear inequality that describes the situation.

    b. Graph the inequality.

    c. Write two possible solutions to the problem.

Graph each linear inequality.

19. $6x - 4y > -16$
20. $y \geq -\frac{1}{4}x - 3$
21. $-5x + 4y < -24$
22. $y < -5x + 6$
23. $6x - 4y < -12$
24. $y \geq -\frac{9}{5}x + 7$
25. $y > \frac{5}{7}x - 3$
26. $y < -5x + 9$
27. $-7x + 3y < -18$
28. $y \geq \frac{6}{5}x - 8$
29. $-12x + 8y < 56$
30. $16x + 6y > 36$

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Practice 7-6

Systems of Linear Inequalities

Solve each system by graphing. Show your work.

1. $y < 6$
   $y > 3$

2. $x < 7$
   $y > 2$

3. $x < 2$
   $x > 5$

4. $x + y > -2$
   $-x + y < 1$

5. $x + y < 2$
   $x + y > 5$

6. $y < -5x + 6$
   $y > 2x - 1$

7. $y < 2x - 3$
   $-2x + y > 5$

8. $-x + 3y < 12$
   $y \geq -x + 4$

9. $y \leq -\frac{1}{2}x + 3$
   $y \geq -\frac{5}{3}x + 2$

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

11. $6x + 4y > 12$
    $-3x + 4y > 12$

12. $3x + y < 6$
    $-2x + y < 6$

13. $-4x + 2y < -2$
    $-2x + y > 3$

14. $-5x + y > -2$
    $4x + y < 1$

15. $y < \frac{9}{5}x - 8$
    $-9x + 5y > 25$

16. $5x + 4y < 1$
    $8y \geq -10x + 24$

17. $6x + 8y < 32$
    $-4x + 6y < 24$

18. $x + 7y < 14$
    $x - 6y > -12$

19. In basketball you score 2 points for a field goal and 1 point for a free throw. Suppose that you have scored at least 3 points in every game this season, and have a season high score of 15 points in one game. How many field goals and free throws could you have made in any one game?

    a. Write a system of two inequalities that describes this situation.

    b. Graph the system to show all possible solutions.

    c. Write one possible solution to the problem.

20. Suppose you need to use at least \$1.00 worth of stamps to mail a package. You have as many \$.03 stamps as you need but only four \$.32 stamps. How many of each stamp can you use?

    a. Write a system of two inequalities that describes this situation.

    b. Graph the system to show all possible solutions.

    c. Write one possible solution to the problem.

21. A grandmother wants to spend at least \$40 but no more than \$60 on school clothes for her grandson. T-shirts sell for \$10 and pants sell for \$20. How many T-shirts and pants could she buy?

    a. Write a system of two inequalities that describes this situation.

    b. Graph the system to show all possible solutions.

    c. Write two possible solutions to the problem.

Name _____ Class _____ Date _____

Reteaching 7-1

Solving Systems by Graphing

OBJECTIVE: Solving systems of linear equations by graphing

MATERIALS: Graph paper, two toothpicks

- When you graph two equations, the point of intersection is the solution.
- To graph each equation, apply the slope-intercept form, $y = mx + b$.

Example

Solve by graphing.

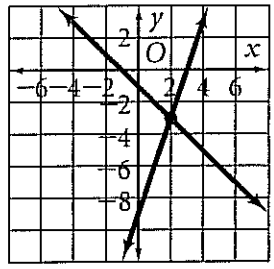
$y = 3x - 9$

$y = -x - 1$

a. In the first equation, $b = -9$ and $m = 3$. Therefore, place one toothpick so that it intersects the y-axis at -9 and has a slope of 3.

b. Graph the second equation with $b = -1$ and $m = -1$ by placing another toothpick that intersects the y-axis at -1 and has a slope of -1.

c. Find the point where the two lines intersect. The lines intersect at $(2, -3)$. The solution of the system is $(2, -3)$.



Check. See whether $(2, -3)$ makes both equations true.

$y = 3x - 9$

$-3 \stackrel{?}{=} 3(2) - 9$

$-3 \stackrel{?}{=} 6 - 9$

$-3 = -3$ ✓

← **Substitute (2, −3) for (x, y).** →

$y = -x - 1$

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

$-3 = -3$ ✓

Exercises

Use graph paper, toothpicks, and steps a–c above to model and solve each system.

1. $y = 5x - 2$
$y = x + 6$

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

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

Solve each system.

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

5. $y = 2x + 1$
$2y = 4x + 2$

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

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

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

9. $y = 3x - 1$
$y = 3x - 4$

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Reteaching 7-2

Solving Systems Using Substitution

OBJECTIVE: Solving systems of linear equations by substitution

MATERIALS: None

Example

Solve using substitution.

$$-4x + y = -13$$
$$x - 1 = y$$

$y = 4x - 13$ ← **Rewrite each equation in the form $y = mx + b$.**

$y = x - 1$

$y = (4x - 13)$ ← **Circle the sides of the equations that do not contain y.**

$y = (x - 1)$

$4x - 13 = x - 1$ ← **Since both circled parts equal y, they are equal to each other.**

$3x = 12$ ← **Solve for x.**

$x = 4$

$y = 4x - 13$ ← **Substitute 4 for x in either equation. Solve for y.**

$y = 4(4) - 13$

$y = 3$

The solution is (4, 3).

Check to see whether (4, 3) makes both equations true. If it doesn't, then the system has no solution.

$-4(4) + 3 \stackrel{?}{=} -13$ $\qquad$ $4 - 1 \stackrel{?}{=} 3$

$-16 + 3 \stackrel{?}{=} -13$ $\qquad$ $3 = 3$ ✓

$-13 = -13$ ✓

Exercises

Solve each system using substitution. Check your solution.

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

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

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

4. $6y + 4x = 12$
$-6x + y = -8$

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

6. $x + 4y = 5$
$4x - 2y = 11$

7. $2y - 3x = 4$
$x = -2$

8. $3y + x = -1$
$x = -3y$

9. $2x + y = -1$
$6x = -3y - 3$

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Reteaching 7-3

Solving Systems Using Elimination

OBJECTIVE: Solving systems of linear equations using elimination

MATERIALS: At least 15 of each of three types or colors of objects, such as beans, colored cubes, or paper clips

When both linear equations of a system are in the form $Ax + By = C$, you can solve the system by elimination. You can use different objects (or, in the example below, symbols) to represent A, B, and C.

Example

Model each equation. Then solve the system of linear equations by elimination.

$4x - 5y = -7$
$4x + y = -1$

Use: ✱ for the coefficient of x,
■ for the coefficient of y, and
✦ for the constant.

a.

x y
✱✱✱✱ − ■■■■■ = −✦✦✦✦✦✦✦
✱✱✱✱ + ■ = −✦

b. Since there are an equal number of ✱s, subtract the second equation to eliminate x.

✱✱✱✱ − ■■■■■ = −✦✦✦✦✦✦✦
(−)✱✱✱✱ + (−)■ = (−)−✦
− ■■■■■■ = −✦✦✦✦✦✦

c. Since there are six items on the variable side of the equation, divide by 6 on both sides to find that $y = 1$.

d. Now solve for the value of the eliminated variable in either equation.

$4x - 5(1) = -7$ ← **Substitute 1 for y.**
$4x = -2$ ← **Solve for x.**
$x = -\frac{1}{2}$

Since $x = -\frac{1}{2}$ and $y = 1$, the solution is $(-\frac{1}{2}, -1)$.

Check. See whether $(-\frac{1}{2}, 1)$ makes the other equation true.

$4x + y = -1$
$4(-\frac{1}{2}) + 1 \stackrel{?}{=} -1$
$-1 = -1$ ✓

Exercises

Use different objects that represent A, B, and C to model and solve each system by elimination.

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

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

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

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Reteaching 7-4

Applications of Linear Systems

OBJECTIVE: Writing and solving systems of linear equations

MATERIALS: Graph paper or graphing calculator

As you solve multi-step systems of linear equations, remember these strategies:

- Determine which form each equation is in:

  $Ax + By = C$ or $y = mx + b$

- If the equations are in the form $Ax + By = C$ and a variable can easily be eliminated, use elimination.
- If the equations are in $y = mx + b$ form, use graphing or substitution.

Example

Last year, Zach received $469.75 in interest from two investments. The interest rates were 7.5% on one account and 8% on the other. If the total amount invested was $6000, how much was invested at each rate?

Define x = investment in first account; y = investment in second account

Relate The total amount invested was $6000.

Write

$x + y = 6000$ ← **Determine the form of each equation: $Ax + By = C$**

$0.075x + 0.08y = 469.75$

$y = -x + 6000$ ← **Since a variable cannot easily be eliminated, rewrite one equation in the form $y = mx + b$.**

$0.075x + 0.08(-x + 6000) = 469.75$ ← **Substitute $-x + 6000$ for y.**

$-0.005x = -10.25$ ← **Solve for x.**

$x = 2050$

$2050 + y = 6000$ ← **Substitute 2050 for x in the first equation and solve for y.**

$y = 3950$

The amount invested in the first account was $2050. The amount invested in the second account was $3950.

Exercises

Model with a system of equations and solve using elimination, substitution, and graphing. Explain which is the best method, and why.

1. Mary ordered lunch for herself and several co-workers on Monday and Tuesday. On Monday, she paid $7 for five sandwiches and four sodas. On Tuesday, she paid $6 for four of each. Find the price of a sandwich and the price of a soda.

2. A local landscape company had a one-week sale. On Monday, Mrs. Jones had $82 to spend. After purchasing 5 trees, she had just enough money left to purchase 1 shrub. Later in that same week, she purchased 2 trees. She had $37 with her, so she again had enough money left to purchase 1 shrub. Find the cost of a tree and the cost of a shrub.

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Reteaching 7-5

Linear Inequalities

OBJECTIVE: Graphing linear inequalities **MATERIALS:** Graph paper

To graph inequalities, use the same strategies used to graph equations. Remember that the boundary line is solid if the inequality has an equal sign (indicating that the points on the boundary line are part of the solution) and dashed if the inequality does not have an equal sign (indicating that the points on the boundary line are not part of the solution).

Example

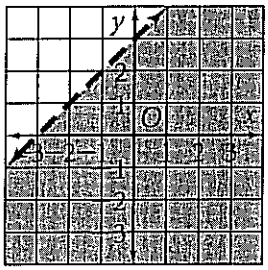
Graph the inequality $y - 3 < x$.

a. The equation of the boundary line is $y - 3 = x$. Rewrite the equation in the form $y = mx + b$.

$y = x + 3$

b. Graph the boundary line, $y = x + 3$. Since coordinates of points on the boundary line do not make the inequality true, graph a dashed line.

c. Use these guidelines for shading: If the inequality sign is less than ($<$), then shade the lower region of the graph (or the left region, for the vertical lines). Otherwise, shade the upper region of the graph (or the right region, for vertical lines).



d. Test the point $(0, 0)$ from the shaded region. See whether $(0, 0)$ satisfies the original inequality.

$y - 3 < x$

$0 - 3 < 0$

$-3 < 0$ **True**

The inequality is true for $(0, 0)$. So the shaded region is correct.

Exercises

Follow steps a–d above to graph each linear inequality.

1. $y < x + 2$
2. $y \leq 2x + 1$
3. $y > x$

Name _____ Class _____ Date _____

Reteaching 7-6

Systems of Linear Inequalities

OBJECTIVE: Solving systems of linear inequalities by graphing

MATERIALS: Graph paper, two highlighting markers in colors that combine to make a third color (pink and yellow, for example)

- When you graph the first inequality, mark the solution area with one color. Then graph the second inequality and mark the solution area with the other color. The common solution for the two inequalities appears where the two colors combine to make a third color.
- To graph inequalities, use the same strategies you use to graph equations.
- The boundary line is solid if the inequality has an equal sign (indicating that the points on the line are part of the solution) and dashed if the inequality does not have an equal sign.

Example

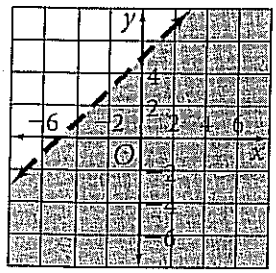
Solve by graphing.

$y - x < 5$
$y + 6 \geq 2x$

a. Rewrite the inequalities in slope-intercept form.
$y < x + 5$
$y \geq 2x - 6$

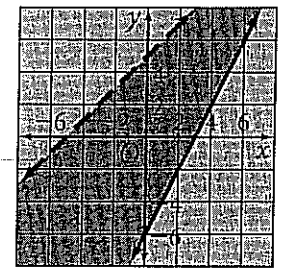
b. Graph the boundary line, $y = x + 5$ using a dashed line.

c. Test the inequality $y - x < 5$ using the point $(0, 0)$. Since the inequality is true for $(0, 0)$, shade the region containing $(0, 0)$ yellow.



d. Graph the boundary line, $y = 2x - 6$ using a solid line.

e. Test the inequality $y + 6 \geq 2x$ using the point $(0, 0)$. It is true; therefore, shade the region containing $(0, 0)$ pink, including the boundary line.



f. The region that appears orange is the solution region.

Exercises

Follow steps a–f above to graph each system of linear inequalities.

1. $y < 4x - 7$
$y > \frac{1}{2}x + 4$

2. $y - 4 < x$
$3y < x + 6$

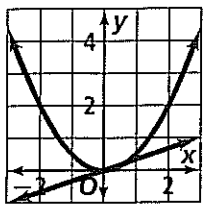
3. $2x + 3y > 6$
$x - y \leq 0$

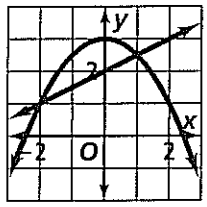
Name _____ Class _____ Date _____

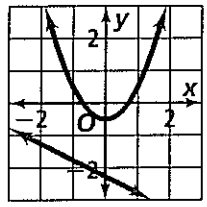
Enrichment 7-1

Lines and Curves

Just as the equations of two lines can be graphed, so can the equations of a curve and a line. The graphs below show intersections of one, two, and no points.

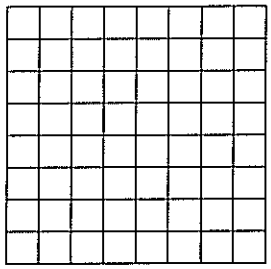




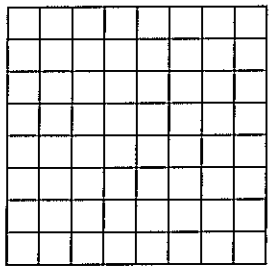


Graph each pair of equations by plotting points. Then describe the intersection.

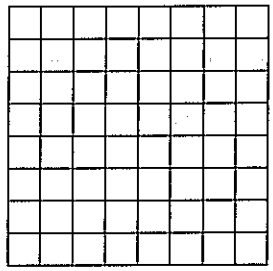
1. $y = x^2$
$y = x - 1$



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



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



Chapter 7 Answers

Practice 7-1

1. (1, 2) **2.** (4, 3) **3.** no solution **4.** (−1, 3) **5.** (7, 4)
6. infinitely many solutions **7.** (−5, 2) **8.** no solution
9. (−1, −1) **10.** (0, −3) **11.** (6, 6) **12.** (−2, −4)
13. no solution **14.** (−3, 5) **15.** (7, 11) **16.** infinitely many solutions **17.** (8, 7) **18.** (−2, −2) **19.** (5, 6) **20.** (1, −2)
21. (5, 4) **22.** (−3, 3) **23.** no solution **24.** (0, 0)
25. $\left(\frac{1}{2}, \frac{1}{2}\right)$ **26.** $\left(\frac{3}{2}, \frac{3}{2}\right)$ **27.** $\left(-\frac{1}{2}, 0\right)$ **28.** $\left(-4, -2\frac{1}{2}\right)$
29. (13, 19) **30.** (8, 22) **31.** (18, 16) **32.** no solution
33. (25, −30) **34.** (0, −10) **35.** (40, 30) **36.** (28, 14)
37. no solution **38.** (36, 42) **39.** (16, 24) **40.** (18, −8)
41. (−1.5, −2.25) **42.** (−2, −1) **43.** (1.5, −2.5)

Practice 7-2

1. (1, 1) **2.** (2, 6) **3.** (5, 5) **4.** (−3, 2) **5.** (0.6, 8) **6.** (7, 4)
7. (5, −2) **8.** infinitely many solutions **9.** (100, 50)
10. no solution **11.** (1, 9) **12.** (−2, −3) **13.** infinitely many solutions **14.** no solution **15.** (1, −2) **16.** (−2, −2)
17. no solution **18.** infinitely many solutions **19.** (4, 8)
20. (2, −2) **21.** no solution **22.** (−3, 0) **23.** (0, −1)
24. infinitely many solutions **25.** $\left(3, -\frac{2}{3}\right)$ **26.** (1.5, 3.6)
27. (6.7, 2.4) **28.** infinitely many solutions **29.** (13, 11)
30. no solution **31.** (10.5, 8.2) **32.** (−6, −24) **33.** infinitely many solutions **34.** (28, −36) **35.** no solution
36. (−18, −30) **37.** 88 cones **38.** paint: \$17/gal, brush: \$5.50

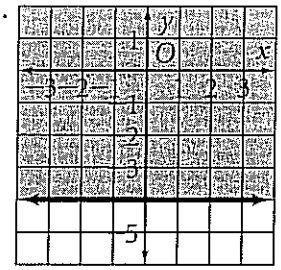
Practice 7-3

1. (1, 3) **2.** (4, 8) **3.** (7, 6) **4.** (2, −1) **5.** (2, 0) **6.** $\left(\frac{1}{2}, 2\right)$
7. (2, −2) **8.** (6, −1) **9.** (18, 12) **10.** (3, 6) **11.** (−1, 5)
12. (0, 2) **13.** (5, 7) **14.** (−1, −3) **15.** (0, 0) **16.** $\left(4, -\frac{1}{3}\right)$
17. (8, 7) **18.** (2, 6) **19.** (4, 11) **20.** (3, 9) **21.** (11, 7)
22. (8, −3) **23.** (7, −3) **24.** (0, 8) **25.** (−1, 2) **26.** (1, 6)
27. (8, −1) **28.** $\left(\frac{3}{2}, 3\right)$ **29.** (4, −3) **30.** (7, −9) **31.** (4, 3)
32. (−7, 11) **33.** (9, 2) **34.** (6, 13) **35.** $\left(-3, \frac{2}{3}\right)$
36. (1, 1) **37.** (2, 5) **38.** (8, 1) **39.** (10, −3) **40.** (7, −7)
41. (8, 8) **42.** (2, 3) **43.** (9, 7) **44.** (6, 11) **45.** $\left(-\frac{1}{9}, 1\right)$
46. shirts: \$7.50; pants: \$18.50 **47.** 20 cherry pies; 16 apple pies

Practice 7-4

1. 30 2-pt; 10 4-pt **2.** 15 offices **3.** \$20; \$15
4. 2.5 mi/h; 0.5 mi/h **5.** 150 min/wk; 100 min/wk
6. 89 T-shirts **7.** 160 mi/h, 10 mi/h **8.** \$2.50; \$1.50
9. 330 spaces; 120 spaces **10.** 37.5 m/min; 12.5 m/min

Practice 7-5

1.


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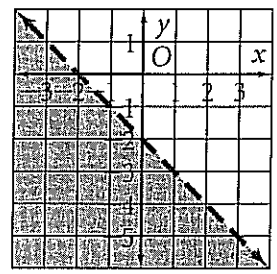

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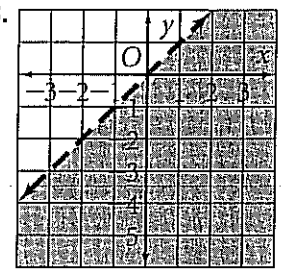

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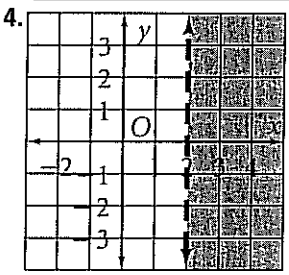

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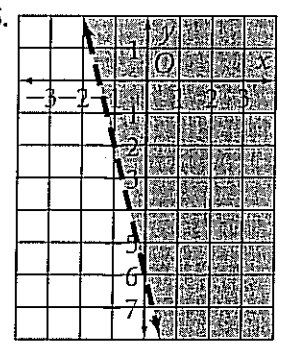

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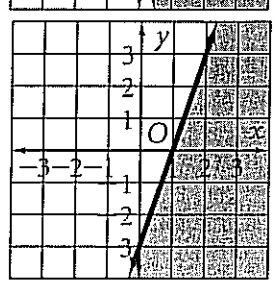

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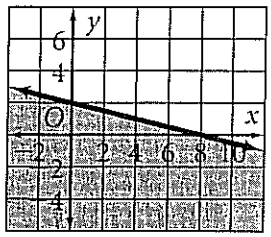

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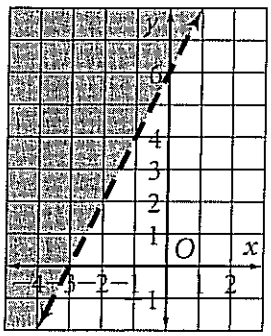

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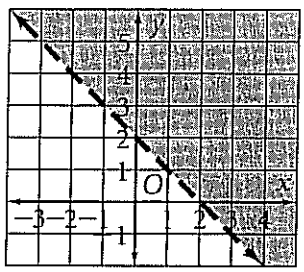

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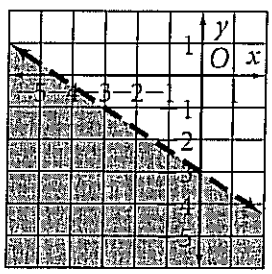

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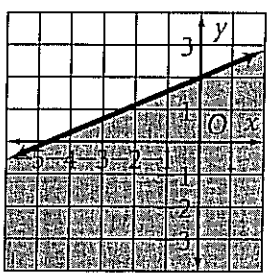

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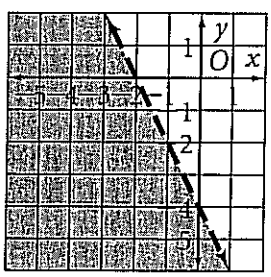

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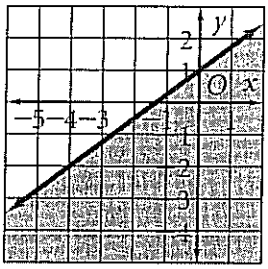

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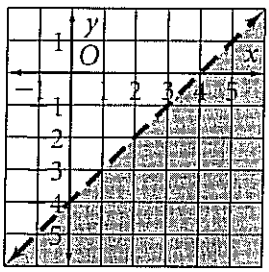

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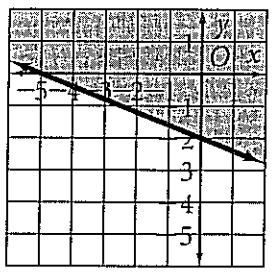
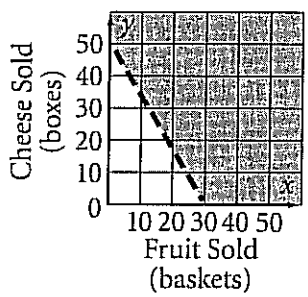


16a. $5x + 3y > 150$

16b.

Red Cross Fundraiser

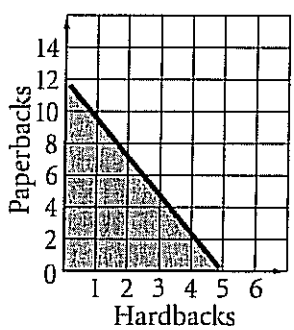


16c. Answers may vary. The solutions are all of the coordinates of the points that are both positive integers within the shaded region. Samples: 20 fruit baskets and 20 cheese boxes; 25 fruit baskets and 10 cheese boxes

17a. $12x + 5y \leq 60$

17b.

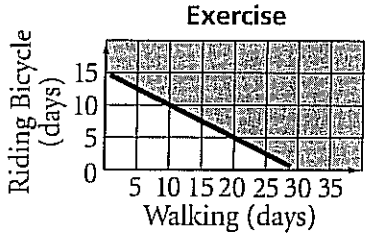
Books Purchased



17c. Answers may vary. The solutions are all of the coordinates of the points that are both positive integers within the shaded region or on the boundary line. Samples: 5 hardbacks and no paperbacks; 3 hardbacks and 2 paperbacks

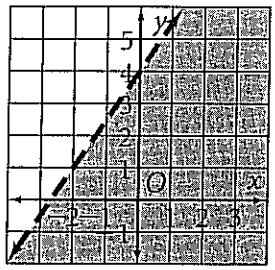
18a. $5x + 10y \geq 150$

18b.

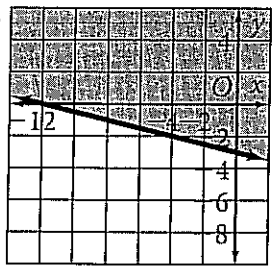


18c. Answers may vary. Samples: 10 days walking and 11 days riding bicycle, 12 days walking and 10 days riding bicycle

19.



20.



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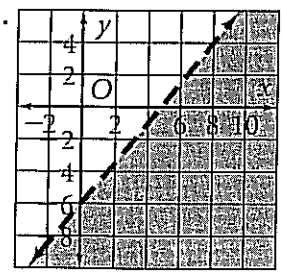

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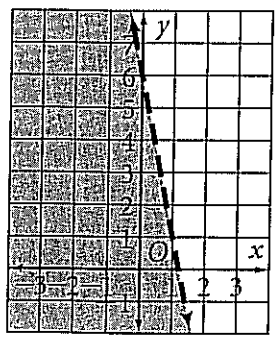

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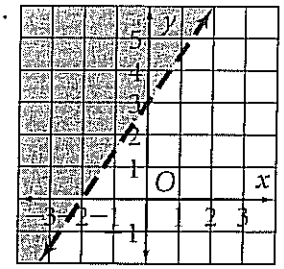

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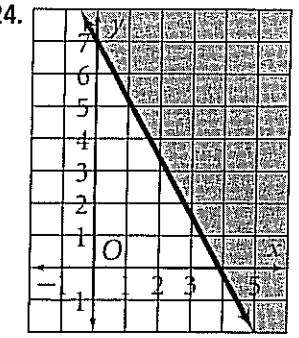

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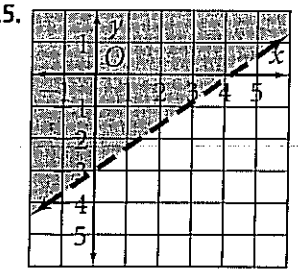

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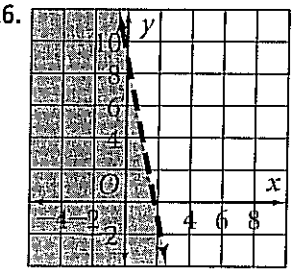

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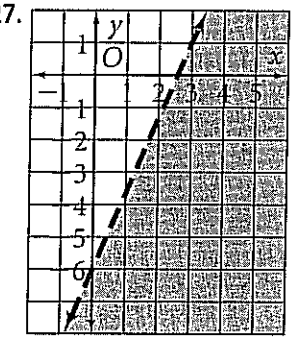
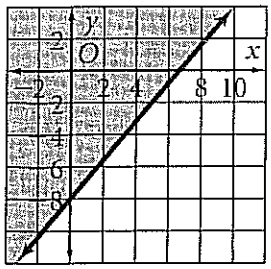
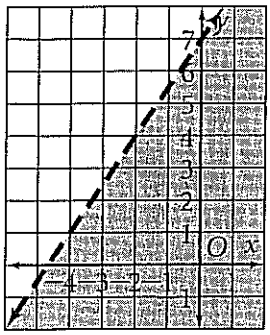
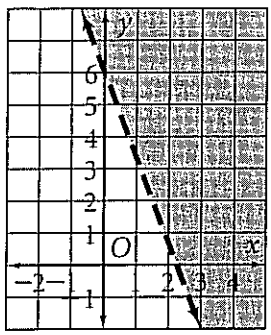
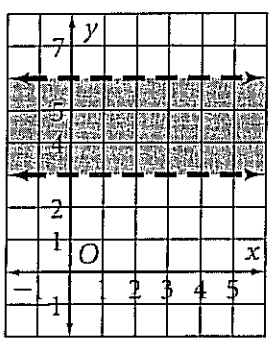


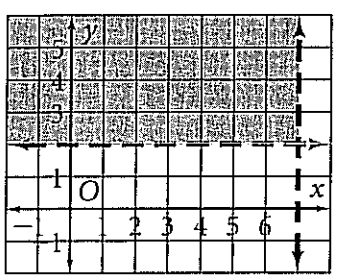
28. 

29. 

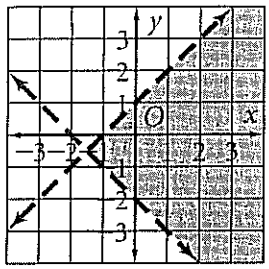
30. 

Practice 7-6

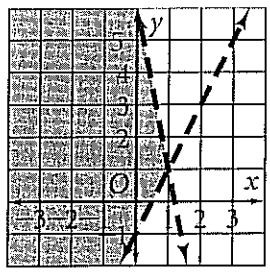
1. 

2. 

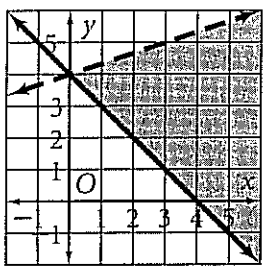
3. no solution

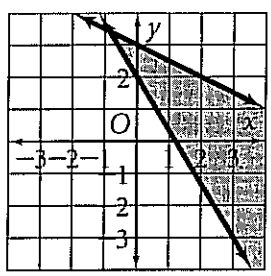
4. 

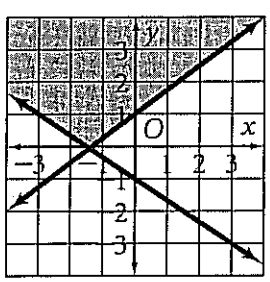
5. no solution

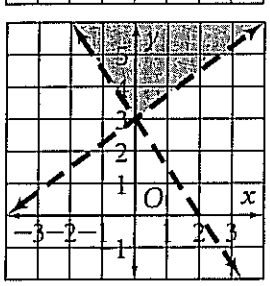
6. 

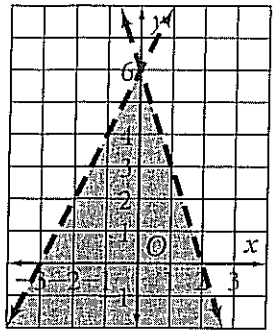
7. no solution

8. 

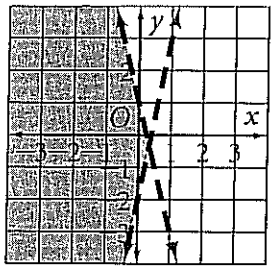
9. 

10. 

11. 

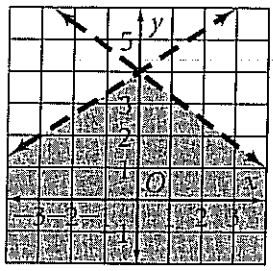
12. 

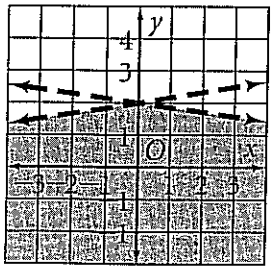
13. no solution

14. 

15. no solution

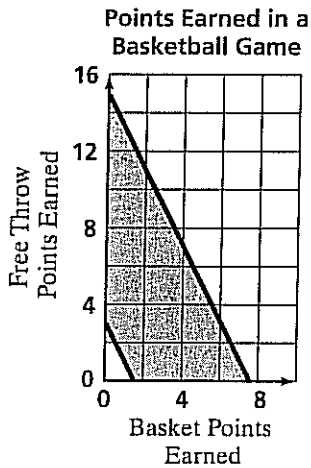
16. no solution

17. 

18. 

19a. $2x + y \geq 3; 2x + y \leq 15$

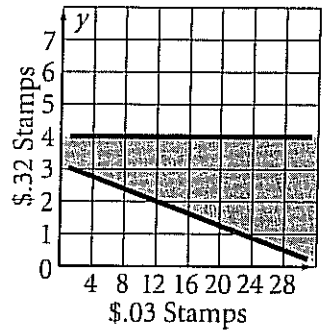
19b.



19c. Answers may vary. The solutions are all of the coordinates of the points that are both positive integers within the shaded region or on the boundary lines. Sample: 4 baskets and 5 free throws

20a. $3x + 32y \geq 100; y \leq 4$

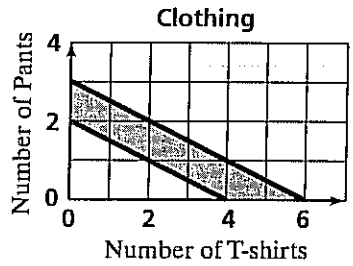
20b.



20c. Answers may vary. The solutions are all of the coordinates of the points that are both positive integers within the shaded region or on the boundary lines. Sample: 4 3-cent stamps and 3 32-cent stamps

21a. $10x + 20y \geq 40; 10x + 20y \leq 60$

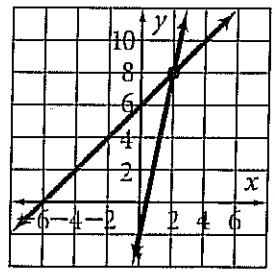
21b.



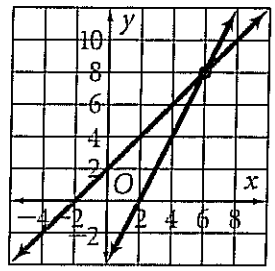
21c. Answers may vary. The solutions are all of the coordinates of the points that are both positive integers within the shaded region or on the boundary lines. Samples; 3 T-shirts and 1 pair of pants, 1 T-shirt and 2 pairs of pants.

Reteaching 7-1

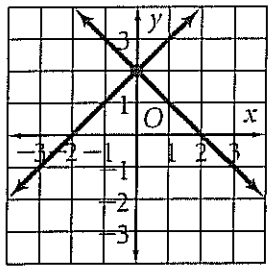
1. (2, 8);



2. (6, 8);



3. (0, 2);



4. no solution 5. infinite number of solutions 6. (3, 0)
7. (−1, −4) 8. (−2, −7) 9. no solution

Reteaching 7-2

1. (4, 10) 2. (−12, −16) 3. (−1, 1) 4. (1.5, 1) 5. (2, −1)
6. (3, 0.5) 7. (−2, −1) 8. no solution 9. infinitely many solutions

Reteaching 7-3

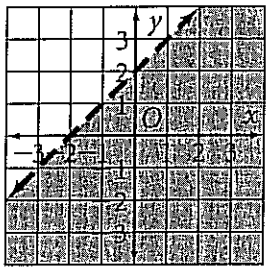
1. $\left(-\frac{4}{3}, 2\right)$ 2. (6, −4) 3. (−1, 1)

Reteaching 7-4

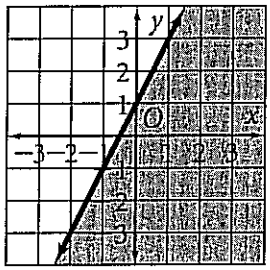
1. $5x + 4y = 7, 4x + 4y = 6$; \$1.00, \$.50; Elimination is easiest since the equations can be written in the form $Ax + By = C$ and the values of B are the same.
2. $82 - 5x = y, 37 - 2x = y$; \$15.00, \$7.00; Use substitution since the equations are in $y = mx + b$ form.

Reteaching 7-5

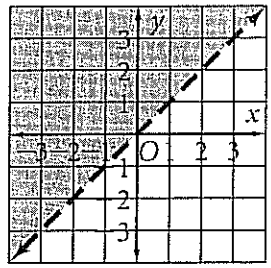
1.



2.

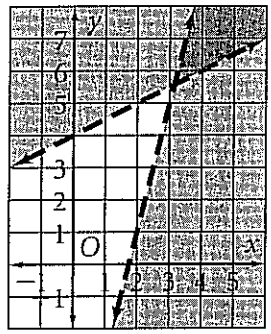


3.

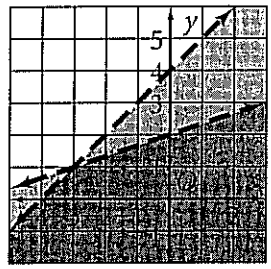


Reteaching 7-6

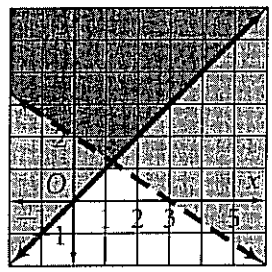
1.



2.

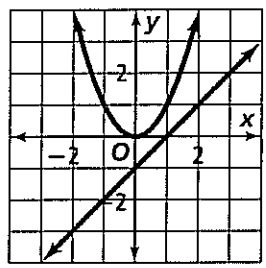


3.



Enrichment 7-1

1.



no intersection