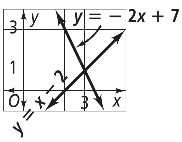
Algebra 2
Lesson 3-1 - Practice and Problem-Solving Exercises Answers

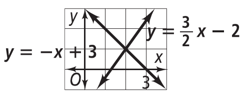
7. How solutions are determined may vary (graphing or using a table). Graphing samples are given.

(3, 1)



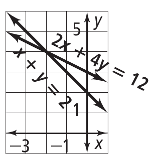
8. How solutions are determined may vary (graphing or using a table). Graphing samples are given.

(2,1)



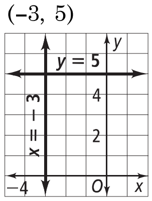
9. How solutions are determined may vary (graphing or using a table). Graphing samples are given.

(−2, 4)



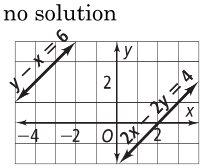
10. How solutions are determined may vary (graphing or using a table). Graphing samples are given.

(−3, 5)



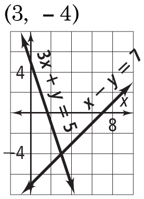
11. How solutions are determined may vary (graphing or using a table). Graphing samples are given.

no solution



12. How solutions are determined may vary (graphing or using a table). Graphing samples are given.

(3, − 4)



13. 2 small; 4 large

14. 3 one-pound bags; 2 three-pound bags

15. Models may vary. Sample:
Use 0 for 1970.

$$\begin{cases} y = 0.22x + 67.5 \\ y = 0.15x + 75.507 \end{cases}$$

Around 2085, the quantities will be equal.

16. Models may vary. Sample:
Use 0 for 1980.

$$\begin{cases} y = 0.232x + 1.328 \\ y = 0.145x + 3.673 \end{cases}$$

Around 2007, the quantities will be equal.

17. dependent

18. inconsistent

19. inconsistent

20. independent

21. independent

22. inconsistent

23. dependent

24. independent

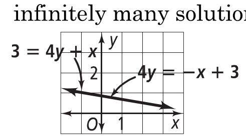
25. independent

26. independent

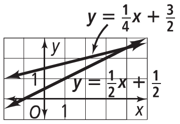
27. dependent

28. inconsistent

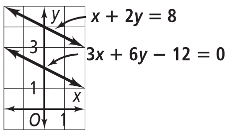
29. infinitely many solutions



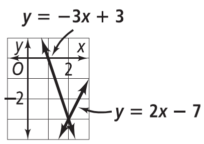
30. $\left(4, \frac{5}{2}\right)$



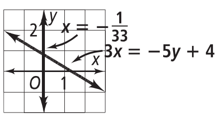
31. no solution



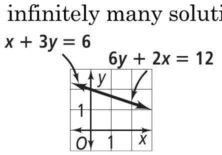
32. (2, −3)



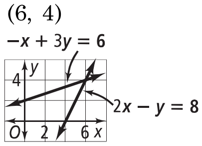
33. $\left(-\frac{1}{33}, \frac{9}{11}\right)$



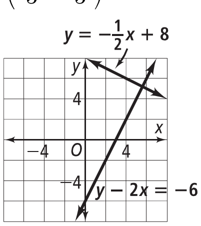
34. infinitely many solutions



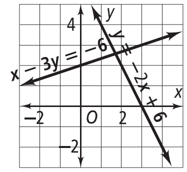
35. (6, 4)



36. $\left(\frac{28}{5}, \frac{26}{5}\right)$



37. $\left(\frac{12}{7}, \frac{18}{7}\right)$

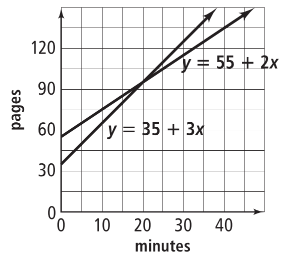


38. inconsistent

39. dependent

40. inconsistent

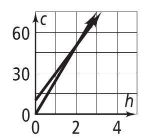
41.



After 20 minutes, you and your friend will have read the same number of pages.

42a. $c = 25h$
$c = 20h + 10$

42b.



The cost would be the same for 2 hours of instruction.

42c. The campus that charges $20 per hour plus a one-time registration of $10 would be cheaper for 10 hours of practice ($210 versus $250).

43. (4, −2)

44. No; they would be the same line, and the system would be dependent and consistent.

45. An independent system has one solution. The slopes are different, but the *y*-intercepts could be the same. An inconsistent system has no solution. The slopes are the same and the *y*-intercepts are different. A dependent system has an infinite number of solutions. The slopes and *y*-intercepts are the same.

46. sometimes

47. sometimes

48. never

49. never

50. Answers may vary. Sample:
$3x + 4y = 12$

51. Answers may vary. Sample:
$5x + 2y = 5$

52. Answers may vary. Sample:
$-10x + 2y = 4$
$5x - y = -2$

53. They are equivalent equations.

54a. The independent variable is *p*, and the dependent variable is *n*.

54b. $n = -1600p + 14{,}800$

54c. $n = -6000p + 32{,}000$

54d. The equilibrium point is about (3.91, 8545). Profits are maximized if about 8545 widgets are sold for about \$3.91 each.

55. A

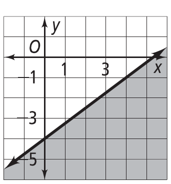
56. G

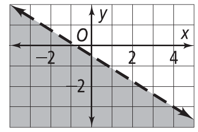
57. C

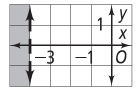
58. Write the equations in slope-intercept form.
Let x = number of 5×7 prints
let y = number of 4×6 prints

$x + y = 6$ $\quad$ $1.75x + 0.25y = 7.5$
$y = -x + 6$ $\quad$ $y = -7x + 30$

Enter the equations in your calculator and view the table.
Adjust the *x*-values until you see $y_1 = y_2$. When $x = 4$, $y_1 = y_2 = 2$. So Amy ordered two 4×6 prints.

59. 

60. 

61. 

62. $n < -\frac{8}{7}$

63. $x \geq -\frac{29}{2}$ or -14.5

64. $x > \frac{5}{8}$

65. 2

66. $-\frac{3}{5}$

67. 2

68. 10

69a. −3

69b. 8

69c. −10

Algebra 2
Lesson 3-2 - Practice and Problem-Solving Exercises Answers

10. (0.5, 2.5)

11. $(-2,\ 4)$

12. (20, 4)

13. (0.75, 2.5)

14. $(10,\ -1)$

15. $(8,\ -1)$

16. $(-6,\ -9)$

17. $(-2,\ -5)$

18. $(-6,\ -6)$

19. seven \$1-bills; eight \$5-bills

20a. Let $m =$ number of multiple choice and $r =$ number of extended response, then

$$\begin{cases} m + r = 20 \\ 2m + 6r = 60 \end{cases}$$

20b. 15 multiple choice; 5 extended response

21. 3 vans and 2 sedans

22. (7, 5)

23. (2, 4)

24. $(-1,\ 3)$

25. $(2,\ -2)$

26. $(-2,\ -4)$

27. (4, 1)

28. (0, 3)

29. (1, 1)

30. $(2,\ -1)$

31. infinite number of solutions; $\{(x, y) \mid -2x + 3y = 13\}$

32. infinite number of solutions; $\{(a, d) \mid -3a + d = -1\}$

33. (3, 2)

34. no solution

35. (5, 4)

36. no solution

37. $\left(\frac{20}{17},\ \frac{19}{17}\right)$

38. $(-3,\ 2)$

39. (4, 1)

40. (1, 3)

41. no solution

42. $(1,\ -4)$

43. 10 deliveries

44. $(-6,\ 30)$

45. $(4,\ -3)$

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

47. $(-3,\ 4)$

48. (6, 4)

49. (300, 150)

50. (–235, – 5.8)

51. (0.5, 0.25)

52. $\left(\frac{5}{2}, -\frac{3}{8}\right)$

53. Error in 5th line: $-4(-7-x)=28+4x$ not $-28-4x$
Lines 5 – 9 should be:
$3x+28+4x=14$
$7x=-14$
$x=-2$
$y=-7-(-2)$
$y=-5$

54. 200 muffins

55. Answers may vary. Sample:
$\begin{cases}-3x+4y=12\\ 5x-3y=13\end{cases}$
(8, 9)

56. 4 ml of 20% sulfuric acid solution and 2 ml of 50% sulfuric acid solution

57. 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.

58. A

59. Substitution; the second equation is solved for y; $(-7, -26)$.

60. Elimination; $2x$ would be eliminated from the system if the equation were subtracted; $\left(9\frac{1}{2}, 5\right)$.

61. Elimination; substitution would be difficult since no coefficient is 1 in the original system. Dividing the first equation by 3 and dividing the second equation by 5 results in an equivalent system where y would be eliminated from the system if the equations were subtracted; $(-1, -3)$.

62. 2875 votes

63. yes, –40 degrees

64. –2

65. 0

66. 8

67. 2

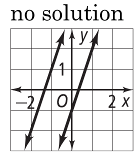
68. 5

69. 6

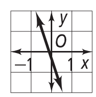
70. 2

71. 4

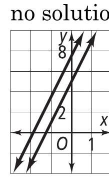
72. no solution



73. infinite number of solutions: $\{(x, y) \mid -9x-3y=1\}$



74. no solution

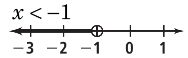


75. function

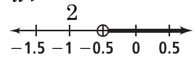
76. function

77. not a function

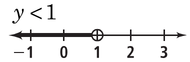
78. $x<-1$



79. $x>-\frac{1}{2}$



80. $y<1$



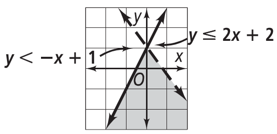
Algebra 2
Lesson 3-3 - Practice and Problem-Solving Exercises Answers

8. (0, 4),(0, 5),(0, 6),(0, 7),(0, 8)

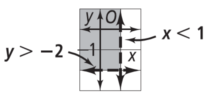
9. (0, 0), (0, 1), (0, 2), (0, 3), (0, 4), (0, 5), (0, 6), (0, 7), (1, 0), (1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6), (2, 0), (2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (3, 3), (3, 4)

10. no solution

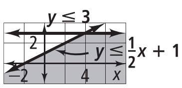
11.



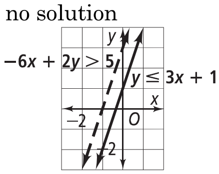
12.



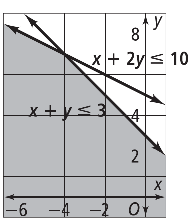
13.



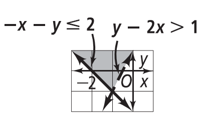
14. no solution



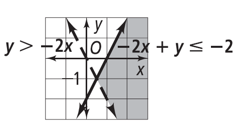
15.



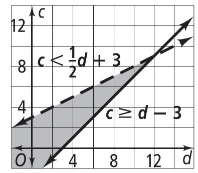
16.



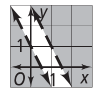
17.



18.



19. no solution

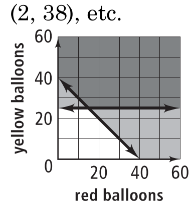


20. Let y = number of yellow balloons and r = number of red balloons.

$r + y \geq 40$

$y \geq 25$

Because the number of balloons must be a whole number, only the points in the overlap that represent whole numbers are solutions of the problem; i.e. (0, 40), (0, 41), (1, 39), (1, 40), (2, 38), etc.

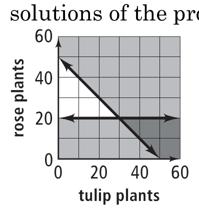


21. Let r = number of rose plants and t = number of tulip plants.

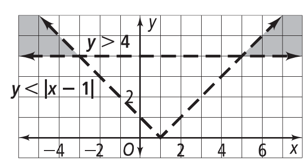
$t + r \geq 50$

$r \leq 20$

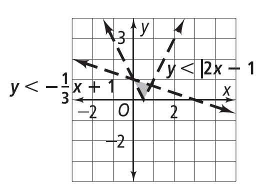
Because the number of plants must be a whole number, only the points in the overlap that represent whole numbers are solutions of the problem.



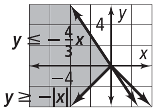
22.

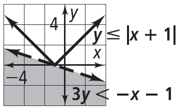


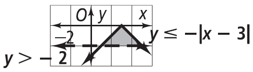
23.

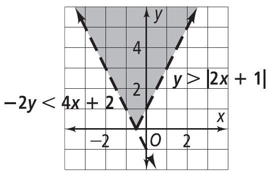


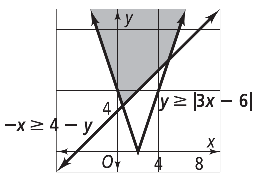
24.

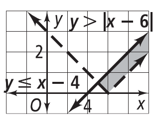
25. 

26. 

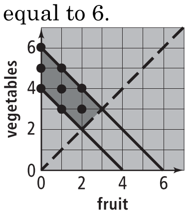
27. 

28. 

29. 

30. 

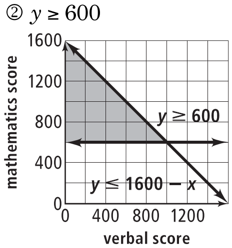
31. (0, 4), (0, 5), (0, 6), (1, 3), (1, 4), (1, 5), (2, 3), (2, 4); the sum of the servings must be greater than or equal to 4 and less than or equal to 6.



32. ① $x + y \le 1600$

$y \le -x + 1600$

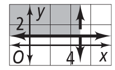
② $y \ge 600$



33. Answers may vary. Sample verbal score:

① $x < 5$

② $y \ge 1$



34. Answers may vary. Sample:
If the isolated variable, *y,* is greater than the remaining expression, the half-plane above the boundary line is shaded. If the variable is less than the remaining expression, then the half-plane below the line is shaded.

35. Use test points that are not on either of the boundary lines and that make the calculations as easy as possible, e.g. the origin.

36. A, C

37. A, B

38. A, C

39. A, B

40. A, C

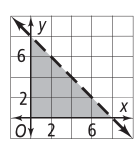
41. B, C

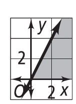
42. A, B, C

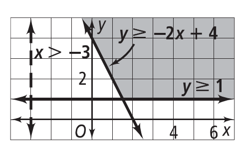
43. A

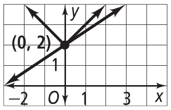
44. B, C

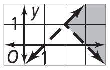
45. A

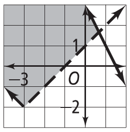
46. 

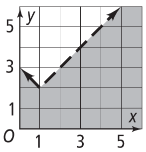
47. 

48. 

49. 

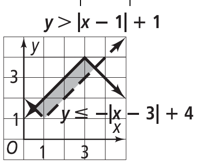
50. 

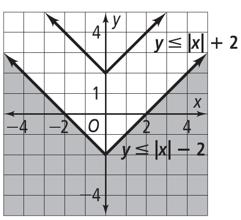
51. 

52. 

53. ① $y > |x-1| + 1$

② $y \le -|x-3| + 4$

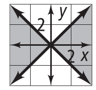


54. 

55. $\begin{cases} y \ge |x| - 2 \\ y \le -|x| + 2 \end{cases}$

56. $\begin{cases} y \le 3 \\ y \ge 0 \\ y \le 3x + 9 \\ y \le -3x + 9 \end{cases}$

57. $\begin{cases} y \le 4 \\ y \ge 0 \\ y \le 2x \\ y \ge 2x - 8 \end{cases}$

58a. 

58b. Answers may vary. Sample:
$\begin{cases} |y| \le \frac{1}{2}|x| \\ |x| \le 2 \end{cases}$

59. C

60. H

61. B

62. Let x = number of hours

$$30x = 20x + 40$$
$$30x - 20x = 40$$
$$10x = 40$$
$$x = 4$$

63. $(-9,\ -26)$

64. $\left(\frac{23}{14},\ -\frac{13}{14}\right)$

65. no solution

66. $(-2,\ -1)$

67. $(-1,\ 2)$

68. $\left(-\frac{4}{7},\ \frac{1}{14}\right)$

69. Answers may vary. Sample:
(0, 3)

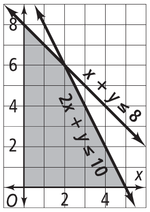
70. Answers may vary. Sample:
(0, 3)

71. Answers may vary. Sample:
$(2,\ -1)$

72. Answers may vary. Sample:
$(1,\ -1)$

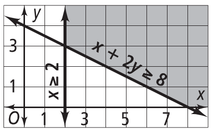
Lesson 3-4 - Practice and Problem-Solving Exercises Answers

10.



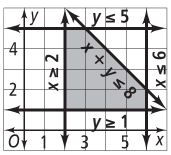
vertices: (0, 0), (5, 0), (2, 6), (0, 8)
maximized at (5, 0)

11.



vertices: (8, 0) and (2, 3)
minimized at (8, 0)

12.



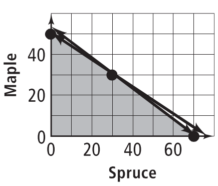
vertices: (2, 1), (6, 1), (6, 2), (3, 5), (2, 5)
maximized at (6, 2)

13a. Let s = number of spruce trees and m = number of maple trees.

$$\begin{cases} 30s + 40m \le 2100 \\ 600s + 900m \le 45{,}000 \\ s \ge 0,\ m \ge 0 \end{cases}$$

13b. $P = 650s + 300m$

13c.



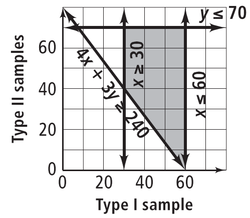
13d. 70 spruce trees and 0 maples trees

14. Let x = number of Type I samples and y = number of Type II samples.

$$\begin{cases} 4x + 3y \ge 240 \\ 30 \le x \le 60 \\ y \le 70,\ x \ge 0,\ y \ge 0 \end{cases}$$

$C = 5x + 7y$

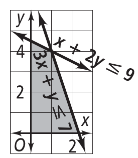
The implicit constraints are $x \ge 0,\ y \ge 0$. $C = 300$ and is minimized at (60, 0); the biologist should use zero Type II bacteria.



15. He is not considering the constraint $y \le x + 3$; maximize when P = 11 at (1, 4).

16. 3 trays of corn muffins and 2 trays of bran muffins

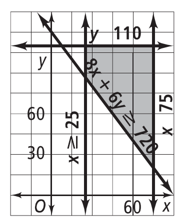
17.



vertices: (0, 0), (1, 4), (0, 4.5), $\left(\frac{7}{3},\ 0\right)$;

maximized when P = 6 at (1, 4)

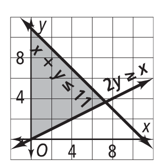
18.



vertices: (75, 20), (75, 110), $\left(25,\ 86\frac{2}{3}\right)$, (25, 110);

minimized when $C = 633\frac{1}{3}$ at $\left(25,\ 86\frac{2}{3}\right)$

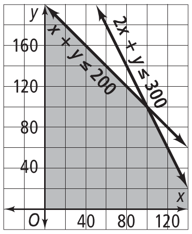
19.



vertices: (0, 0), $\left(7\frac{1}{3},\ 3\frac{2}{3}\right)$, (0, 11);

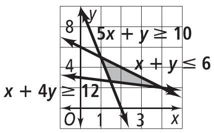
maximized when $P = 29\frac{1}{3}$ at $\left(7\frac{1}{3},\ 3\frac{2}{3}\right)$

20.



vertices: (0, 0), (150, 0), (100, 100), (0, 200);
maximized when $P = 400$ at (0, 200)

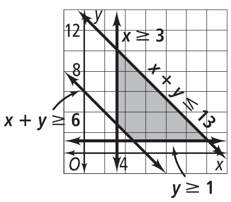
21.



vertices: $\left(\frac{28}{19}, \frac{50}{19}\right)$, (4, 2), (1, 5);

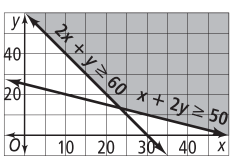
minimized when $C = 67{,}368$ at $\left(\frac{28}{19}, \frac{50}{19}\right)$

22.



vertices: (3, 3), (3, 10), (5, 1), (12, 1);
maximized when $P = 51$ at (12, 1)

23.



vertices: (0, 60), $\left(23\frac{1}{3}, 13\frac{1}{3}\right)$, (50, 0);

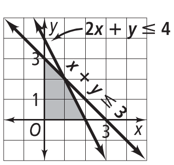
minimized when $x = 23\frac{1}{3}$ and $y = 13\frac{1}{3}$;
Round to (23, 14) and (24, 13); (24, 13) gives a minimum cost of $261

24. Answers may vary. Sample:
(4, 6), (6, 5), (9, 3.5), (10, 3)

25. C

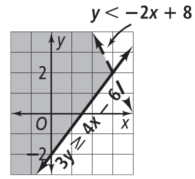
26. I

27.

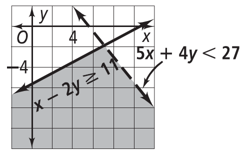


vertices: (0, 0), (2, 0), (0, 3) and (1, 2)

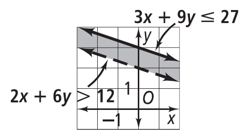
28.



29.



30.



31. 1

32. –34

33. 24

34. 65

35. (0, 6), (–3, 0)

36. (0, 4), (18, 0)

37. (0, –1), (1, 0)

Algebra 2
Lesson 3-5 - Practice and Problem-Solving Exercises Answers

9. $(4,\ 2,\ -3)$

10. $(0,\ 2,\ -3)$

11. $(2,\ 1,\ -5)$

12. $(-3,\ 1,\ -1)$

13. $\left(\frac{1}{2},\ -3,\ 1\right)$

14. $(0,\ 3,\ -2)$

15. $(1,\ -4,\ 3)$

16. $(1,\ 1,\ 1)$

17. $(4,\ -1,\ 2)$

18. $\left(-\frac{122}{11},\ \frac{72}{11},\ \frac{71}{11}\right)$

19. $\left(-\frac{10}{13},\ -\frac{2}{13},\ \frac{4}{13}\right)$

20. $(2,\ -1,\ 1)$

21. $(8,\ -4,\ 2)$

22. $(2,\ 3,\ -2)$

23. $(-2,\ -1,\ -3)$

24. $(5,\ 2,\ 2)$

25. $(0,\ 1,\ 7)$

26. $(4,\ 1,\ 6)$

27. $(5,\ -2,\ 0)$

28. $(1,\ -1,\ 2)$

29. $(1,\ 3,\ 2)$

30. Machine A: 112 bolts per hour
Machine B: 90 bolts per hour
Machine C: 85 bolts per hour

31. $m\angle P = 32^\circ$
$m\angle Q = 96^\circ$
$m\angle R = 52^\circ$

32. Section A has 24,500 seats, Section B has 14,400 seats, and Section C has 10,100 seats.

33. $(8,\ 1,\ 3)$

34. $(3,\ 2,\ -3)$

35. $\left(\frac{1}{2},\ 2,\ -3\right)$

36. $(-2,\ -1,\ 12)$

37. no solution

38. $(21.6,\ 7.2,\ 14.4)$

39. $(2,\ 4,\ 6)$

40. $(-1,\ 2,\ 0)$

41. $(0,\ 2,\ -3)$

42. He placed \$2200 in the savings account, \$4400 in government bonds, and \$3400 in the mutual fund.

43. Answers may vary. Sample:
Solution is $(1,\ 2,\ 3)$

$$\begin{cases} x + y + z = 6 \\ 2x - y + 2z = 6 \\ 3x + 3y + z = 12 \end{cases}$$

44. ① $\begin{cases} x + 2y = 180 \\ y + z = 180 \\ 5z = 540 \end{cases}$
②
③

solution is $x = 36,\ y = 72,\ z = 108$

45. Let E, F, and V represent the number of edges, faces, and vertices, respectively. From the first statement, $E = 5F$. But since each edge is part of two faces, this counts each edge twice. So $E = \frac{5}{2}F$. Since every face has 5 vertices and every vertex is shared by 3 faces, $3V = 5F$, or $V = \frac{5}{3}F$. Euler's formula: $V + F = E + 2$. Solving this system of 3 equations yields $E = 30$, $F = 12$, and $V = 20$.

46. $\frac{3}{2}$

47. $\frac{3}{2}$

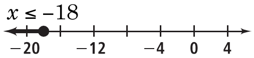
48. 33

49. 144 mezzanine seats

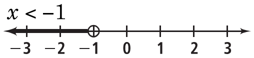
50. $P = 12$ is maximized at (0, 4).

51. $x \geq -\frac{3}{2}$

52. $x \leq -18$



53. $x < -1$



54. $\left(7,\ \frac{5}{4}\right)$

55. dependent system; infinite number of solutions, $\left\{(x,\ y) \middle| y = -\frac{1}{2}x - \frac{3}{4}\right\}$

56. inconsistent system; no solution

Algebra 2
Lesson 3-6 - Practice and Problem-Solving Exercises Answers

8. 7

9. 1

10. 6

11. 8

12. $\left[\begin{array}{cc|c} 1 & 2 & 11 \\ 2 & 3 & 18 \end{array}\right]$

13. $\left[\begin{array}{cc|c} 3 & 2 & 16 \\ 0 & 1 & 5 \end{array}\right]$

14. $\left[\begin{array}{cc|c} 2 & -3 & 6 \\ 1 & 1 & 2 \end{array}\right]$

15. $\left[\begin{array}{ccc|c} 1 & -1 & 1 & 150 \\ 2 & 0 & 1 & 425 \\ 0 & 1 & 3 & 0 \end{array}\right]$

16. $\left[\begin{array}{cc|c} -3 & 1 & -7 \\ 1 & 0 & 2 \end{array}\right]$

17. $\left[\begin{array}{ccc|c} 1 & -1 & 1 & 0 \\ 1 & -2 & -1 & 5 \\ 2 & -1 & 2 & 8 \end{array}\right]$

18. $\begin{cases} x = 4 \\ y = -6 \end{cases}$

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

20. $\begin{cases} -x + 2y = -6 \\ x + y = 7 \end{cases}$

21. $\begin{cases} 2x + y + z = 1 \\ x + y + z = 2 \\ x - y + z = -2 \end{cases}$

22. $\begin{cases} y + 2z = 4 \\ -2x + 3y + 6z = 9 \\ x + z = 3 \end{cases}$

23. $\begin{cases} 5x + 2y + z = 5 \\ 4x + y + 2z = 8 \\ x + 3y - 6z = 2 \end{cases}$

24. (2, 1)

25. (–1, 0)

26. $\left(\frac{1}{2},\ 20\right)$

27. (4, 6)

28. (6, 0)

29. (2, 3)

30. $\begin{cases} 5e + 2p = 0.23 \\ 7e + 5p = 0.41 \end{cases}$

$\left[\begin{array}{cc|c} 5 & 2 & 0.23 \\ 7 & 5 & 0.41 \end{array}\right]$

31. \$10,000 at 4% and \$15,000 at 6%. Let $x =$ amount invested at 4% and $y =$ amount invested at 6%.

$\begin{cases} x + y = 25{,}000 \\ 0.04x + 0.06y = 1300 \end{cases}$

$\left[\begin{array}{cc|c} 1 & 1 & 25{,}000 \\ 0.04 & 0.06 & 1300 \end{array}\right] = \left[\begin{array}{cc|c} 1 & 0 & 10{,}000 \\ 0 & 1 & 15{,}000 \end{array}\right]$

32. $(1,\ 1,\ 0)$

33. $(3,\ 1,\ 1)$

34. no unique solution

35. $(35,\ -22,\ -16)$

36. $(3,\ 2,\ 1)$

37. $(1,\ 1,\ 1,\ 1)$

38a. Let $x =$ weight of almonds at \$2.45/lb, $y =$ weight of hazelnuts at \$1.85/lb and $z =$ weight of raisins at \$0.80/lb
$x + y + z = 9$; the total weight of the nuts and raisins is 9 lbs
$2.45x + 1.85y + 0.80z = 15$; the total cost of the nuts and raisins is \$15
$x + y = 2z$; twice as much of the nuts as the raisins by weight or the total weight of the nuts is equal to twice the weight of the raisins

38b. $(2.5,\ 3.5,\ 3)$

38c. 2.5 lb almonds, 3.5 lb hazelnuts, and 3 lb raisins

39. (2, 3)

40. There is no solution for y. The only solution is $x = 2$.

41. 1 quart of red paint: \$7.75; 1 quart of yellow paint: \$5.75

42. 14

43. Answers may vary. Sample: 0; 0

44. Answers may vary. Sample: 0; 1

45. (8, 2)

46. $(5,\ -10)$

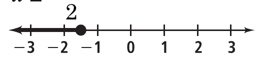
47. $\left(\frac{1}{8},\ -\frac{1}{17}\right)$

48. C

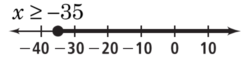
49. G

50.
$$\begin{aligned} y &= 7x - 3 \\ -6x + y &= 2 \\ -6x + (7x - 3) &= 2 \\ x - 3 &= 2 \\ x &= 5 \\ y &= 7(5) - 3 \\ y &= 32 \end{aligned}$$
$(5,\ 32)$

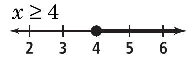
51. $x \le -\frac{3}{2}$



52. $x \ge -35$



53. $x \ge 4$



54. $\frac{15}{2},\ -\frac{9}{2}$

55. $10,\ -10$

56. $10,\ -6$

57. $y = 2x$

58. $y = \frac{1}{3}x$