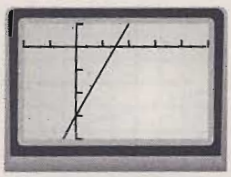
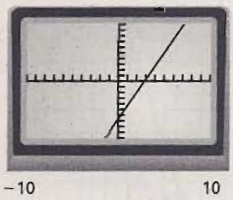
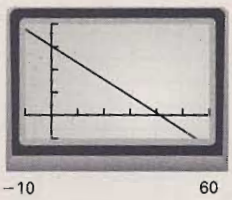
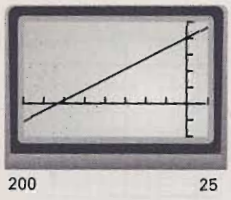
5. 

6. 

7. 

8. 

Lesson 2.4

2.4 Guided Practice (p. 95)

1. The constant of variation is the common value of $\frac{y}{x}$ when x and y show direct variation.

2. Given the slope, m, and the y-intercept, b, use the equation $y = mx + b$. Given the slope, m, and a point on the line, (x_1, y_1), use the equation $y - y_1 = m(x - x_1)$. Given two points on the line, use the points to find the slope of the line and then use the slope and one of the points to find the equation, as above.

3. *Sample answer:* the cost of a bag of apples and the weight of the fruit in the bag

4. $y = \frac{2}{5}x + 2$

5. $y + 4 = 2(x - 0)$
$y = 2x - 4$

6. $y - 2 = -3(x - 5)$
$y = -3x + 17$

7. $y - 0 = -\frac{3}{4}(x + 7)$
$y = -\frac{3}{4}x - \frac{21}{4}$

8. $m = \frac{8 - 2}{4 - 1} = \frac{6}{3} = 2$
$y - 8 = 2(x - 4)$
$y = 2x$

9. $m = \frac{0 - 2}{-5 - 0} = \frac{2}{5}$
$y - 0 = \frac{2}{5}(x + 5)$
$y = \frac{2}{5}x + 2$

10. $m_1 = 3$, perpendicular $m_2 = -\frac{1}{3}$
$y + 6 = -\frac{1}{3}(x - 1)$
$y = -\frac{1}{3}x - \frac{17}{3}$

11. $m = 5$
$y - 9 = 5(x - 3)$
$y = 5x - 6$

12. $c = 1.25p$
$c = 1.25(5)$
$c = 6.25$ million cassettes

2.4 Practice and Applications (pp. 95–98)

13. $y = 5x - 3$ **14.** $y = -3x - 4$ **15.** $y = -4x$

16. $y = 4$ **17.** $y = \frac{3}{5}x + 6$ **18.** $y = -\frac{3}{4}x + \frac{7}{3}$

19. $y - 4 = 2(x - 0)$
$y = 2x + 4$

20. $y - 0 = 3(x - 1)$
$y = 3x - 3$

21. $y - 5 = 0(x + 6)$
$y = 5$

22. $y - 3 = -\frac{2}{3}(x - 9)$
$y - 3 = -\frac{2}{3}x + 6$
$y = -\frac{2}{3}x + 9$

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

24. $y + 4 = \frac{2}{5}(x - 7)$
$y + 4 = \frac{2}{5}x - \frac{14}{5}$
$y = \frac{2}{5}x - \frac{34}{5}$

25. $m = 2$
$y + 1 = 2(x - 1)$
$y = 2x - 3$

26. $m_1 = \frac{-4 + 6}{3 - 4} = \frac{2}{-1} = -2$
$m_2 = \frac{1}{2}$
$y + 10 = \frac{1}{2}(x - 6)$
$y + 10 = \frac{1}{2}x - 3$
$y = \frac{1}{2}x - 13$

27. The slope needs to be undefined which means the line is horizontal; therefore $x = 2$.

28. $m_1 = \frac{4 + 6}{-10 - 6} = \frac{2}{4} = \frac{1}{2}$
$y - 6 = \frac{1}{2}(x - 4)$
$y = \frac{1}{2}x + 4$

29. $y - 1 = \frac{1 + 2}{1 + 1}(x - 1)$
$y - 1 = \frac{3}{2}(x - 1)$
$y = \frac{3}{2}x - \frac{1}{2}$

30. $y - 8 = \frac{8 - 4}{-4 + 6}(x + 4)$
$y - 8 = \frac{4}{2}(x + 4)$
$y = 2x + 16$

31. $y + 5 = \frac{-15 + 5}{15 + 5}(x + 5)$
$y + 5 = -\frac{10}{20}(x + 5)$
$y + 5 = -\frac{1}{2}(x + 5)$
$y = -\frac{1}{2}x - \frac{15}{2}$

32. $y + 6 = \frac{-6 + 18}{-9 + 12}(x + 9)$
$y + 6 = \frac{12}{3}(x + 9)$
$y + 6 = 4x + 36$
$y = 4x + 30$

33. $y - 6 = \frac{6 - 2}{2 - 6}(x - 2)$
$y - 6 = -1(x - 2)$
$y = -x + 8$

34. $y - 0 = \frac{0-3}{0+1}(x-0)$

$y = -3x$

35. $y - 5 = \frac{5-14}{8-11}(x-8)$

$y - 5 = \frac{-9}{-3}(x-8)$

$y - 5 = 3x - 24$

$y = 3x - 19$

36. $y - 9 = \frac{9-7}{-5+4}(x+5)$

$y - 9 = -2(x+5)$

$y - 9 = -2x - 10$

$y = -2x - 1$

37. $y - 1 = \frac{1-8}{0+8}(x-0)$

$y - 1 = -\frac{7}{8}x$

$y = -\frac{7}{8}x + 1$

38. $y - 0 = \frac{6-0}{-4-2}(x-2)$

$y = -3(x-2)$

$y = -3x + 6$

39. $y - 15 = \frac{15+10}{5+20}(x-5)$

$y - 15 = x - 5$

$y = x + 10$

40. $y - 0 = \frac{0-6}{-2-0}(x+2)$

$y = 3(x+2)$

$y = 3x + 6$

41. $3 = \left(-\frac{1}{2}\right)(2) + b$

$3 = -1 + b$

$b = 4$

The equation is $y = -\frac{1}{2}x + 4$, the same as in Example 2. The slope-intercept equation of a line is unique.

42. $y - 4 = 1(x-3)$

$m = \frac{-1-4}{-2-3} = \frac{-5}{-5} = 1$

$y = x + 1$

This is the same equation as in Example 4, since the slope-intercept equation of a line is unique.

43. $y = \frac{7}{2}x$

$y = \frac{7}{2}(8) = 28$

44. $y = -\frac{5}{2}x$

$y = -\frac{5}{2}(8) = -20$

45. $y = -3x$

$y = -3(8) = -24$

46. $y = \frac{1}{6}x$

$y = \frac{1}{6}(8) = \frac{4}{3}$

47. $y = \frac{1}{2}x$

$y = \frac{1}{2}(8) = 4$

48. $y = 2x$

$y = 2(8) = 16$

49. $y = \frac{1}{2}x$

$-5 = \frac{1}{2}x$

$-10 = x$

50. $y = \frac{5}{3}x$

$-5 = \frac{5}{3}x$

$-3 = x$

51. $y = \frac{1}{5}x$

$-5 = \frac{1}{5}x$

$-25 = x$

52. $y = \frac{1}{50}x$

$-5 = \frac{1}{50}x$

$-250 = x$

53. $y = \frac{1}{2}x$

$-5 = \frac{1}{2}x$

$-10 = x$

54. $y = -\frac{22}{3}x$

$-5 = -\frac{22}{3}x$

$\frac{15}{22} = x$

55. yes; $y = \frac{1}{2}x$

56. no

57. yes; $y = -x$

58. yes; $y = -2x$

59. $P = 60{,}300t + 2{,}842{,}200$

$P = 60{,}300(24) + 2{,}842{,}200$

$P = 4{,}289{,}400$

60. $a = 0.138(t - 386) + 201$

$a = 0.138(2243) + 201$

$a \approx \$510.53$

61. $s = 0.629t + 7.4$

$s = 0.629(22) + 7.4$

$s \approx \$21.2$ billion

62. $V = \frac{5}{9}C + 333$

$V = \frac{5}{9}(60) + 333$

$V = \frac{100}{3} + 333$

$V = 366\frac{1}{3}$ m/sec

63. $h = \frac{1}{7}l$

$(5.5) = \frac{1}{7}l$

$38.5 \text{ ft} = l$

64. $C = 3.65t$

$438 = 3.65t$

$120 \text{ min} = t$

$2 \text{ h} = t$

65. $r = \frac{1}{240}t$

$2.75 \text{ in.} = \frac{1 \text{ in.}}{240 \text{ sec}}t$

$660 \text{ sec} = t$

$11 \text{ min} = t$

66. $A = 3w$

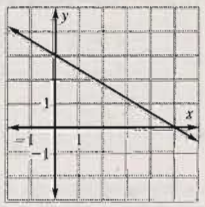
$A = 3(7.5 \text{ in.})$

$A = 22.5 \text{ in.}^2$

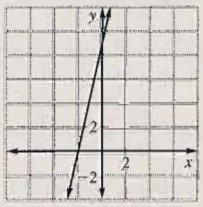
67. no

68. no

69. a.



b.



c. a is the x-intercept, b is the y-intercept.

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

e. $\frac{x}{-5} + \frac{y}{-8} = 1$

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

70. $m = \frac{y-b}{x-0}$

$m = \frac{y-b}{x}$

$mx = y - b$

$y = mx + b$

2.4 Mixed Review (p. 98)

71. $|x - 10| = 17$

$x - 10 = -17$ or $x - 10 = 17$

$x = -7$ or $x = 27$

72. $|7 - 2x| = 5$

$7 - 2x = -5$ or $7 - 2x = 5$

$-2x = -12$ or $-2x = -2$

$x = 6$ or $x = 1$

73. $|-x - 9| = 1$

$-x - 9 = -1$ or $-x - 9 = 1$

$-x = 8$ or $-x = 10$

$x = -8$ or $x = -10$

74. $|4x + 1| = 0.5$

$4x + 1 = -0.5$ or $4x + 1 = 0.5$

$4x = -1.5$ or $4x = -\frac{1}{2}$

$x = -\frac{3}{8}$ or $x = -\frac{1}{8}$

75. $|22x + 6| = 9.2$

$22x + 6 = -9.2$ or $22x + 6 = 9.2$

$22x = -15\frac{1}{5}$ or $22x = 3\frac{1}{5}$

$x = -\frac{38}{55}$ or $x = \frac{8}{55}$

76. $|5.2x + 7| = 3.8$

$5.2x + 7 = -3.8$ or $5.2x + 7 = 3.8$

$5.2x = -10\frac{4}{5}$ or $5.2x = -\frac{16}{5}$

$x = \frac{-27}{13} \approx -2.08$ or $x = \frac{-8}{13} \approx -0.615$

77. $m = \dfrac{7 + 7}{2 - 1} = \dfrac{14}{1} = 14$ **78.** $m = \dfrac{-4 + 1}{-5 + 1} = \dfrac{-3}{-4} = \dfrac{3}{4}$

79. $m = \dfrac{10 - 4}{5 - 2} = \dfrac{6}{3} = 2$ **80.** $m = \dfrac{-1 + 2}{-3 - 5} = -\dfrac{1}{8}$

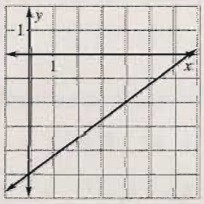
81. $m = \dfrac{4 - 4}{2 + 2} = \dfrac{0}{4} = 0$ **82.** $m = \dfrac{4 + 1}{-5 + 4} = \dfrac{3}{-9} = -\dfrac{1}{3}$

83. $m = \dfrac{10 + 8}{-9 + 0} = \dfrac{18}{-9} = -2$

84. $m = \dfrac{5 - 11}{-6 - 6} = -\dfrac{17}{0}$; undefined

85. $m = \dfrac{11 - 4}{-4 + 11} = \dfrac{7}{7} = 1$

86.



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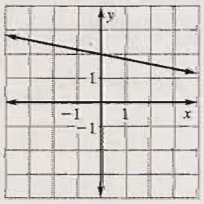

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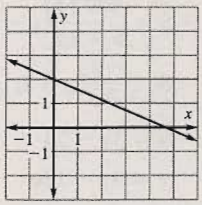

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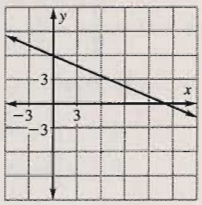

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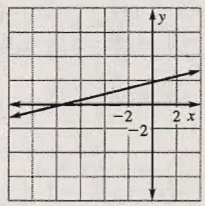

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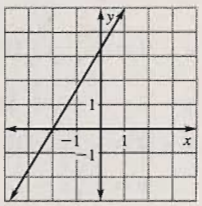

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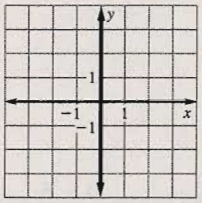

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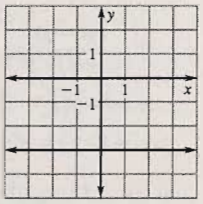

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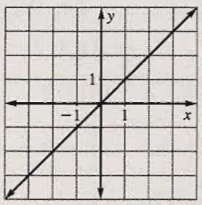

Developing Concepts Activity 2.5 (p. 99)

Good responses to the 4 steps and 6 exercises should include all of these:

- a complete table with 10 different data points
- an accurate scatter plot of the data
- a reasonable guess of the best-fitting line
- correct calculation of slope and y-intercept, with a correct equation
- correct use of model to predict y for $x = 300$ cm
- an actual measurement to check prediction

Lesson 2.5

2.5 Guided Practice (p. 103)

1. Positive correlation occurs if y-tends to increase as x-increases. A negative correlation occurs if y tends to decrease as x increases. Relatively no correlation occurs if the points show no linear pattern.
2. *Sample answer:* A positive correlation; taller men tend to have larger feet.
3. *Sample answer:* Two data points lie on the line and all the rest are above the line. There should be about as many data points below the line as there are above.