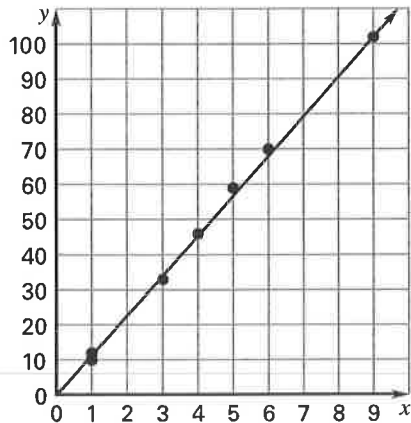


Answers for 5.6

For use with pages 328–331

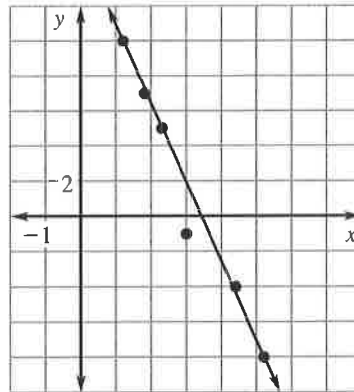
5.6 Skill Practice

- increase
- When data has a positive correlation, the dependent variable tends to increase as the independent variable increases. When data has a negative correlation, the dependent variable tends to decrease as the independent variable increases. When data has relatively no correlation where there is no apparent relationship between the independent variable and the dependent variable.
- positive correlation
- relatively no correlation
- negative correlation
- Sample answer:* $y = 11.5x - 0.28$



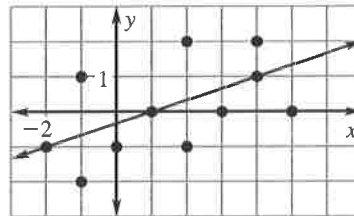
7. *Sample answer:*

$$y = -4.4x + 14.88$$



8. C

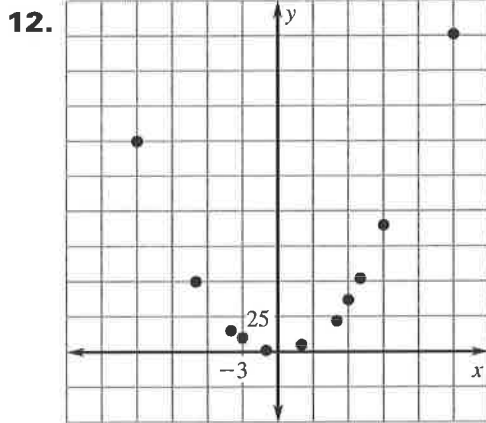
9. The line does not have approximately half the data above it and half below it.



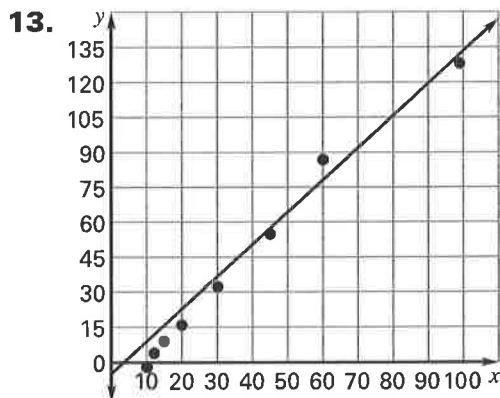
10. The independent variable is x , not y ; the dependent variable decreases as x increases.

11. *Sample answer:* The amount of time driving a car and the amount of gas left in the gas tank.

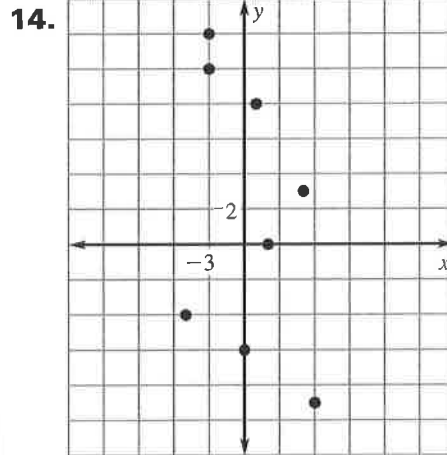
Answers for 5.6 *continued*
 For use with pages 328–331



relatively no correlation; no; because there is relatively no correlation in the data you cannot write an equation.



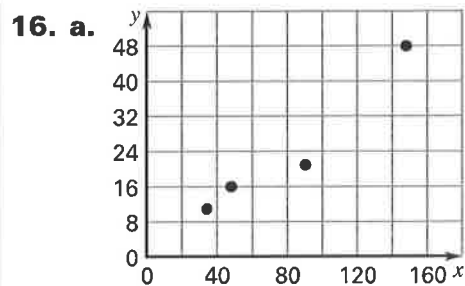
positive correlation;
Sample answer: $y = 1.49x - 13$



relatively no correlation

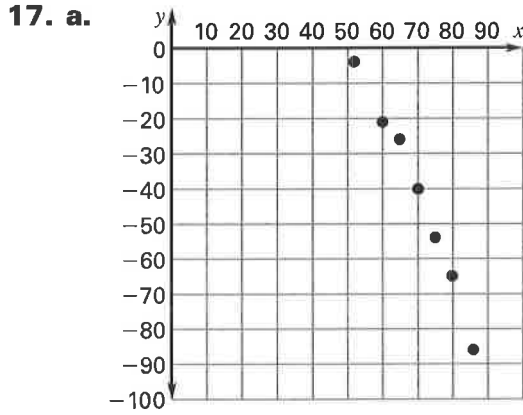
- 15.** Line *b*; line *a* has too many points below the line, but line *b* has about half the points above the line and about half the points below the line.

5.6 Problem Solving

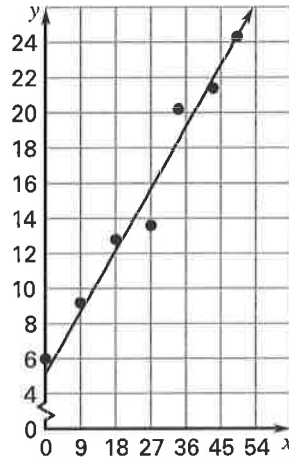
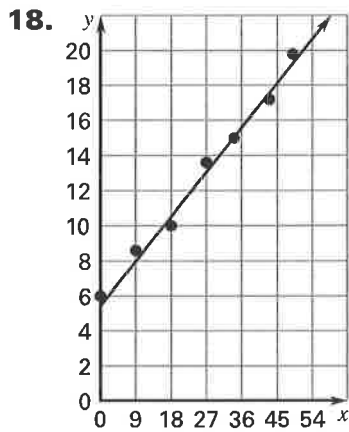


- b.** Positive correlation; the larger the home range size the larger the percent of pacing time.
c. No; it is below the expected percent of time spent pacing.

Answers for 5.6 *continued*
 For use with pages 328–331



- b.** *Sample answer:*
 $y = -2.2x + 111$
- c.** *Sample answer:*
 -2.2 degrees per kilometers



The growth rate of alligator 2 is slightly greater than the growth rate of alligator 1.

- 19.** *Sample answer:* $y = 12.6x + 32$
- 20. a.** *Sample answer:* $y = 1.2x + 30$
- b.** *Sample answer:*
 1.2 min per day
- c.** No; it will continue through June and then start decreasing.
- 21. a.** *Sample answer:*
 $h = 17.8y + 93.6$
- b.** *Sample answer:*
 $m = 0.78h - 33.2$
- c.** *Sample answer:*
 $m = 13.884y + 39.808$; the function models the amount of money, m , spent on the Internet as a function of the number of years, y , since 1999.

Answers for 5.6 *continued*
For use with pages 328–331

- 21. d.** Yes; if you substitute the number of years since 1999 for y , you get about the amount of money, m , given in the data.

5.6 Mixed Review

22. $-18, 17, -8$

23. $20, -50, 0$

24. $24, -11, 14$

25. $y = x + 4$

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

27. $y = x - 1$

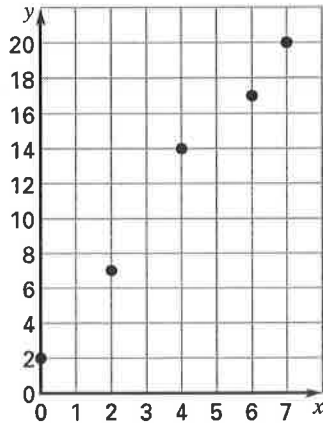
28. parallel: a and c

Answers for 5.7

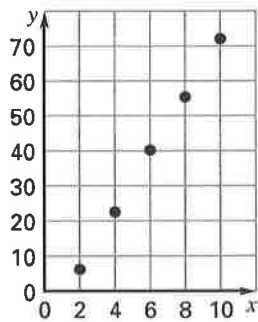
For use with pages 338–343

5.7 Skill Practice

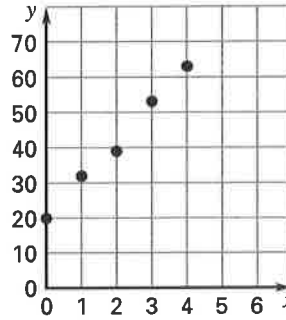
1. linear interpolation
2. Extrapolation is finding an approximate value outside the range of known values. Interpolation is finding an approximate value within the range of known values.
3. $y = 2.5x + 2$; 14.5



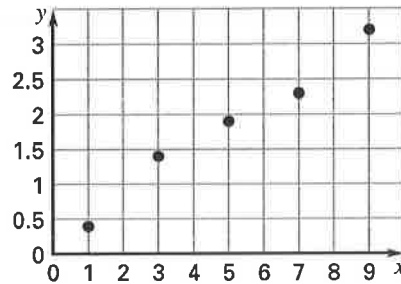
4. $y = 8.2x - 10.1$; 30.9



5. $y = 10.7x + 20$; 127



6. *Sample answer:*
 $y = 0.33x + 0.22$; 3.52



7. $2\frac{2}{3}$
8. 7
9. -16
10. 4
11. 1.5
12. 1.4

13. To find the zero of a function, substitute 0 for y , not x ;

$$0 = 2.3x - 2, 2 = 2.3x,$$

$$x = \frac{20}{23}.$$

14. B

15. a and b were not substituted correctly; $y = 4.47x + 23.1$.

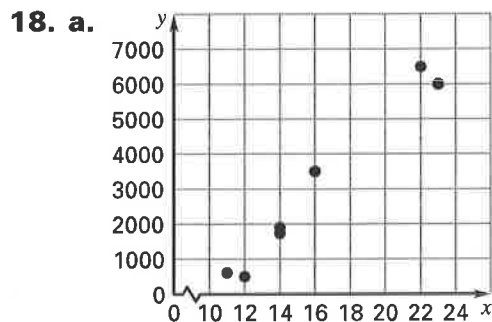
Answers for 5.7 *continued*

For use with pages 338–343

16. *Sample answer:* Temperature on a mountain depends on the elevation. The zero indicates the elevation at which the temperature is 0°F.

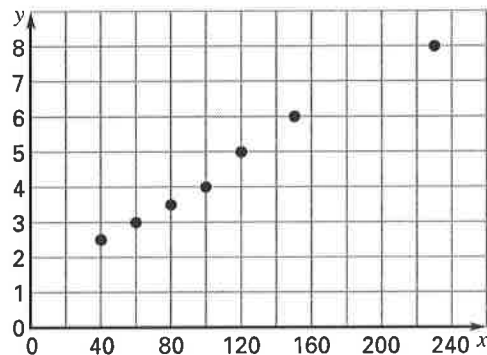
- 17. a.** No; the data would first have a positive slope and then a negative slope.
- b.** You could fit a line to the data for the first 10 years and then fit another line to the data for the following 10 years.

5.7 Problem Solving



- b.** $y = 513x - 5258$
- c.** \$5002

19. a.



b. $y = 0.03x + 1.23$

c. about 8.73 ft²

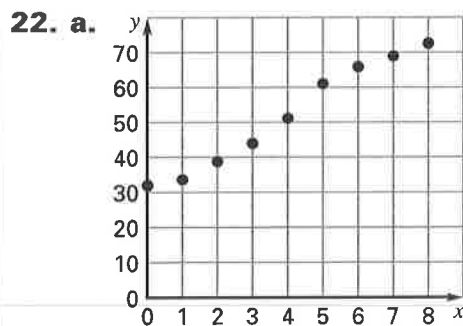
20. a. $y = 31.5x + 1540$

b. 31.5 stations per year

c. 2002

21. a. $y = -197.6x + 3542$

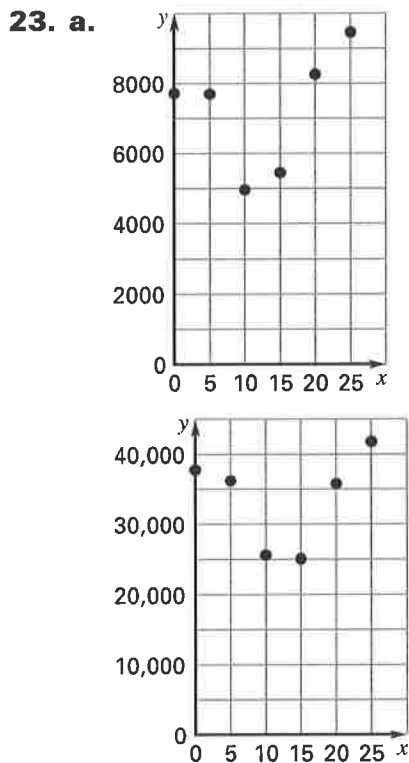
b. about 17.9; 17.9 years from 1985, or 2002, the number of people living in high noise areas will be 0; no.



b. $y = 5.7x + 29.3$

Answers for 5.7 *continued*
For use with pages 338–343

22. c. About -5.14 ; about 5.14 years before 1994, or 1988, the number of households with PCs was 0.



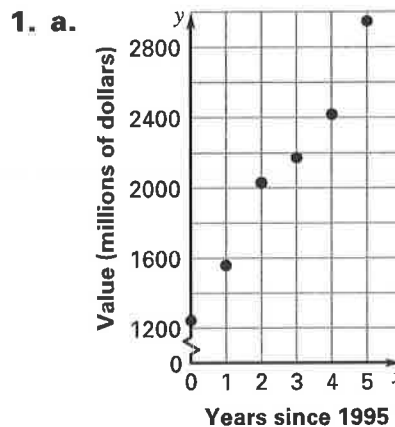
There is relatively no correlation in either scatter plot.

b. No; because you cannot find a line of best fit for either correlation, you cannot use the mallard duck population to predict the total duck population.

5.7 Mixed Review

- 24.** -27 **25.** -2.3 **26.** -7.6
27. -0.5 **28.** 110 **29.** 5
30. -1 **31.** 0 **32.** 7

5.5–5.7 Mixed Review of Problem Solving



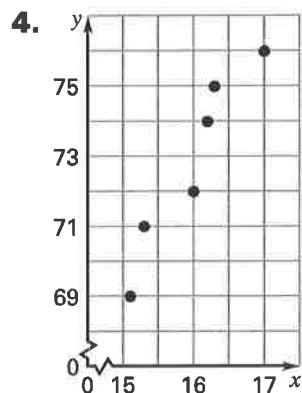
- b.** $y = 321x + 1260$
c. about \$321 million per year
d. 2002

2. 2;

			2
	<input checked="" type="radio"/>	<input checked="" type="radio"/>	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	0	0	0
1	1	1	1
2	2	2	<input checked="" type="radio"/>
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

Answers for 5.7 *continued*
For use with pages 338–343

3. *Sample answer:* $y = 8x + 5$



positive correlation

5. a. $y = -1.1x + 9.1$

b. about -1.1 percent per year

c. 8.3; 8.3 years after 1998,
or 2006, the percent of revenue
from U.S. music sales made
through music clubs will be 0.

6. $C = 4g + 2.25$, $C = 4g + 1.75$;
the graphs have the same slopes,
but different C -intercepts.

5

CHAPTER REVIEW

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- Multi-Language Glossary
- Vocabulary practice

REVIEW KEY VOCABULARY

- point-slope form, p. 302
- converse, p. 319
- perpendicular, p. 320
- scatter plot, p. 325
- positive correlation, negative correlation, relatively no correlation, p. 325
- line of fit, p. 326
- best-fitting line, p. 335
- linear regression, p. 335
- interpolation, p. 335
- extrapolation, p. 336
- zero of a function, p. 337

VOCABULARY EXERCISES

- Copy and complete: If a best-fitting line falls from left to right, then the data have a(n) ? correlation. **negative**
- Copy and complete: Using a linear function to approximate a value beyond a range of known values is called ?. **extrapolation**
- WRITING** What is the zero of a function, and how does it relate to the function's graph? *Explain.* **The zero of a function is the x-value of the function when $y = 0$; it is the x-intercept of the graph.**

REVIEW EXAMPLES AND EXERCISES

Use the review examples and exercises below to check your understanding of the concepts you have learned in each lesson of Chapter 5.

5.1 Write Linear Equations in Slope-Intercept Form

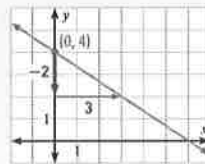
pp. 283–289

EXAMPLE

Write an equation of the line shown.

$y = mx + b$ Write slope-intercept form.

$y = -\frac{2}{3}x + 4$ Substitute $-\frac{2}{3}$ for m and 4 for b .



EXERCISES

Write an equation in slope-intercept form of the line with the given slope and y-intercept.

4. slope: 3

y-intercept: -10
 $y = 3x - 10$

5. slope: $\frac{4}{9}$

y-intercept: 5 $y = \frac{4}{9}x + 5$

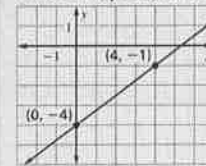
6. slope: $-\frac{2}{11}$

y-intercept: 7 $y = -\frac{2}{11}x + 7$

7. **GIFT CARD** You have a \$25 gift card for a bagel shop. A bagel costs \$1.25. Write an equation that gives the amount (in dollars) that remains on the card as a function of the total number of bagels you have purchased so far. How much money is on the card after you buy 2 bagels? $y = -1.25x + 25$; \$22.50

Extra Example 5.1

Write an equation of the line shown.



$y = \frac{3}{4}x - 4$

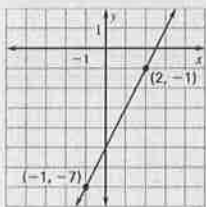
EXAMPLES
1 and 5
on pp. 283, 285
for Exs. 4–7

Extra Example 5.2

Write an equation of the line that passes through the point (6, 4) and has a slope of 3. $y = 3x - 14$

Extra Example 5.3

Write an equation in point-slope form of the line shown.



$$y + 7 = 2(x + 1) \text{ or } y + 1 = 2(x - 2)$$

11. $y - 7 = -6(x - 4)$ or $y - 1 = -6(x - 5)$

12. $y + 2 = -\frac{1}{3}(x - 9)$ or

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

13. $y + 2 = -\frac{6}{11}(x + 3)$ or

$$y + 8 = -\frac{6}{11}(x - 8)$$

EXAMPLE 1
on p. 292
for Exs. 8–10

EXAMPLES 3 and 5
on pp. 303, 304
for Exs. 11–14

346 Chapter 5 Writing Linear Equations

CHAPTER REVIEW

5.2 Use Linear Equations in Slope-Intercept Form

pp. 292–299

EXAMPLE

Write an equation of the line that passes through the point $(-2, -6)$ and has a slope of 2.

STEP 1 Find the y-intercept.

$$y = mx + b \quad \text{Write slope-intercept form.}$$

$$-6 = 2(-2) + b \quad \text{Substitute 2 for } m, -2 \text{ for } x, \text{ and } -6 \text{ for } y.$$

$$-2 = b \quad \text{Solve for } b.$$

STEP 2 Write an equation of the line.

$$y = mx + b \quad \text{Write slope intercept form.}$$

$$y = 2x - 2 \quad \text{Substitute 2 for } m \text{ and } -2 \text{ for } b.$$

EXERCISES

Write an equation in slope-intercept form of the line that passes through the given point and has the given slope m .

8. $(-3, -1); m = 4$
 $y = 4x + 11$

9. $(-2, 1); m = 1$
 $y = x + 3$

10. $(8, -4); m = -3$
 $y = -3x + 20$

5.3 Write Linear Equations in Point-Slope Form

pp. 302–308

EXAMPLE

Write an equation in point-slope form of the line shown.

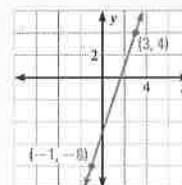
STEP 1 Find the slope of the line.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-8 - 4}{-1 - 3} = \frac{-12}{-4} = 3$$

STEP 2 Write an equation. Use $(3, 4)$.

$$y - y_1 = m(x - x_1) \quad \text{Write point-slope form.}$$

$$y - 4 = 3(x - 3) \quad \text{Substitute 3 for } m, 3 \text{ for } x_1, \text{ and } 4 \text{ for } y_1.$$



EXERCISES

Write an equation in point-slope form of the line that passes through the given points. 11–13. See margin.

11. $(4, 7), (5, 1)$

12. $(9, -2), (-3, 2)$

13. $(8, -8), (-3, -2)$

14. **BUS TRIP** A bus leaves at 10 A.M. to take students on a field trip to a historic site. At 10:25 A.M., the bus is 100 miles from the site. At 11:15 A.M., the bus is 65 miles from the site. The bus travels at a constant speed. Write an equation in point-slope form that relates the distance (in miles) from the site and the time (in minutes) after 10:00 A.M. How far is the bus from the site at 11:30 A.M.? $y - 100 = -\frac{7}{10}(x - 25)$ or $y - 65 = -\frac{7}{10}(x - 75)$; 54.5 mi

5.4 Write Linear Equations in Standard Form

pp. 311–316

EXAMPLE

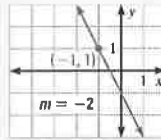
Write an equation in standard form of the line shown.

$$y - y_1 = m(x - x_1) \quad \text{Write point-slope form.}$$

$$y - 1 = -2(x - (-1)) \quad \text{Substitute 1 for } y_1, -2 \text{ for } m, \text{ and } -1 \text{ for } x_1.$$

$$y - 1 = -2x - 2 \quad \text{Distributive property}$$

$$2x + y = -1 \quad \text{Collect variable terms on one side, constants on the other.}$$



EXERCISES

Write an equation in standard form of the line that has the given characteristics.

15. Slope: -4 ; passes through $(-2, 7)$ 16. Passes through $(-1, -5)$ and $(3, 7)$
 $4x + y = -1$ $-3x + y = -2$
17. **COSTUMES** You are buying ribbon to make costumes for a school play. Organza ribbon costs \$.07 per yard. Satin ribbon costs \$.04 per yard. Write an equation to model the possible combinations of yards of organza ribbon and yards of satin ribbon you can buy for \$5. List several possible combinations. $0.07r + 0.04s = 5$. *Sample answer:* 4 organza, 118 satin; 8 organza, 111 satin; 12 organza, 104 satin

EXAMPLES
2 and 5
on pp. 311, 313
for Exs. 15–17

5.5 Write Equations of Parallel and Perpendicular Lines

pp. 319–324

EXAMPLE

Write an equation of the line that passes through $(-4, -2)$ and is perpendicular to the line $y = 4x - 7$.

The slope of the line $y = 4x - 7$ is 4. The slope of the perpendicular line through $(-4, -2)$ is $-\frac{1}{4}$. Find the y -intercept of the perpendicular line.

$$y = mx + b \quad \text{Write slope-intercept form.}$$

$$-2 = -\frac{1}{4}(-4) + b \quad \text{Substitute } -\frac{1}{4} \text{ for } m, -4 \text{ for } x, \text{ and } -2 \text{ for } y.$$

$$-3 = b \quad \text{Solve for } b.$$

An equation of the perpendicular line through $(-4, -2)$ is $y = -\frac{1}{4}x - 3$.

EXERCISES

Write an equation of the line that passes through the given point and is (a) parallel to the given line and (b) perpendicular to the given line.

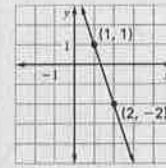
18. $(0, 2), y = -4x + 6$ 19. $(2, -3), y = -2x - 3$ 20. $(6, 0), y = \frac{3}{4}x - \frac{1}{4}$
 a. $y = -4x + 2$ a. $y = -2x + 1$ a. $y = \frac{3}{4}x - 4\frac{1}{2}$; b. $y = -\frac{4}{3}x + 8$
 b. $y = \frac{1}{4}x + 2$ b. $y = \frac{1}{2}x - 4$

Chapter Review 347

EXAMPLES
1 and 4
on pp. 319, 321
for Exs. 18–20

Extra Example 5.4

Write an equation in standard form of the line shown. $3x + y = 4$



Extra Example 5.5

Write an equation of the line that passes through $(-2, -2)$ and is parallel to the line $y = \frac{3}{2}x - 5$.
 $y = \frac{3}{2}x + 1$

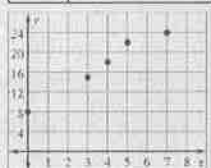
5

CHAPTER REVIEW

Extra Example 5.6

The table shows the number of students who joined the astronomy club at a school from 1996 to 2003. Make a scatter plot of the data. Describe the correlation of the data.

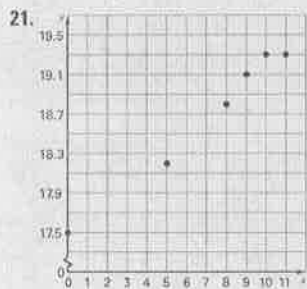
Year	Students in the Astronomy Club
1996	8
1999	15
2000	18
2001	22
2003	24



The scatter plot shows a positive correlation, which means that the number of students who joined the astronomy club tended to increase with each passing year.

Extra Example 5.7

Use the scatter plot from Extra Example 5.6 to estimate the number of students who joined the club in 1998. About 13 students joined the astronomy club in 1998.



5.6 Fit a Line to Data

pp. 323-331

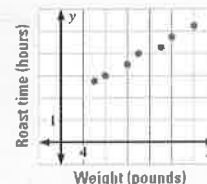
EXAMPLE

The table shows the time needed to roast turkeys of different weights. Make a scatter plot of the data. Describe the correlation of the data.

Weight (pounds)	6	8	12	14	18	20	24
Roast time (hours)	2.75	3.00	3.50	4.00	4.25	4.75	5.25

Treat the data as ordered pairs. Let x represent the turkey weight (in pounds), and let y represent the time (in hours) it takes to roast the turkey. Plot the ordered pairs as points in a coordinate plane.

The scatter plot shows a positive correlation, which means that heavier turkeys tend to require more time to roast.



EXERCISES

EXAMPLE 2
on p. 326
for Ex. 21

21. **AIRPORTS** The table shows the number of airports in the United States for several years during the period 1990–2001. Make a scatter plot of the data. Describe the correlation of the data. See margin for art; positive correlation.

Years:	1990	1995	1998	1999	2000	2001
Airports (thousands)	17.5	18.2	18.8	19.1	19.3	19.3

5.7 Predict with Linear Models

pp. 335-341

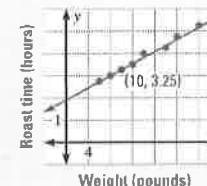
EXAMPLE

Use the scatter plot from the example for Lesson 5.6 above to estimate the time (in hours) it takes to roast a 10 pound turkey.

Draw a line that appears to fit the points in the scatter plot closely. There should be approximately as many points above the line as below it.

Find the point on the line whose x -coordinate is 10. At that point, you can see that the y -coordinate is about 3.25.

▶ It takes about 3.25 hours to roast a 10 pound turkey.



EXERCISES

EXAMPLE 2
on p. 336
for Ex. 22

22. **COOKING TIMES** Use the graph in the Example above to estimate the time (in hours) it takes to roast a turkey that weighs 30 pounds. Explain how you found your answer. About 5.75 h. *Sample answer:* Use the points (10, 3.25) and (8, 3) to find the slope of the line to be 0.125. Looking at the graph, you can see that the y -intercept is 2, so the equation of the line is $y = 0.125x + 2$. Substitute 30 for x to find $y = 5.75$.

Write an equation in slope-intercept form of the line with the given slope and y-intercept.

1. slope: 5
y-intercept: -7 $y = 5x - 7$
2. slope: $\frac{2}{5}$
y-intercept: -2 $y = \frac{2}{5}x - 2$
3. slope: $-\frac{4}{3}$
y-intercept: 1 $y = -\frac{4}{3}x + 1$

Write an equation in slope-intercept form of the line that passes through the given point and has the given slope m .

4. $(-2, -8)$; $m = 3$
 $y = 3x - 2$
5. $(1, 1)$; $m = -4$
 $y = -4x + 5$
6. $(-1, 3)$; $m = -6$
 $y = -6x - 3$

Write an equation in point-slope form of the line that passes through the given points. 7–9. See margin.

7. $(4, 5)$, $(2, 9)$
8. $(-2, 2)$, $(8, -3)$
9. $(3, 4)$, $(1, -6)$

Write an equation in standard form of the line with the given characteristics.

10. Slope: 10; passes through $(6, 2)$
 $-10x + y = -58$
11. Passes through $(-3, 2)$ and $(6, -1)$
 $\frac{1}{3}x + y = 1$

Write an equation of the line that passes through the given point and is (a) parallel to the given line and (b) perpendicular to the given line. 12–14. See margin.

12. $(2, 0)$, $y = -5x + 3$
13. $(-1, 4)$, $y = -x - 4$
14. $(4, -9)$, $y = \frac{1}{4}x + 2$

Make a scatter plot of the data. Draw a line of fit. Write an equation of the line.

15.

x	0	1	2	3	4
y	15	35	53	74	94

 16.

x	0	2	4	8	10
y	-2	6	15	38	50

 15, 16. See margin.

17. **FIELD TRIP** Your science class is taking a field trip to an observatory. The cost of a presentation and a tour of the telescope is \$60 for the group plus an additional \$3 per person. Write an equation that gives the total cost C as a function of the number of people p in the group. $C = 3p + 60$

18. **GOLF FACILITIES** The table shows the number of golf facilities in the United States during the period 1997–2001.

- a. Make a scatter plot of the data where x is the number of years since 1997 and y is the number of golf facilities (in thousands). See margin.

- b. Write an equation that models the number of golf facilities (in thousands) as a function of the number of years since 1997. *Sample answer:* $y = 0.28x + 14.6$

- c. At about what rate did the number of golf facilities change during the period 1997–2001?

- d. Use the equation from part (b) to predict the number of golf facilities in 2004. *Sample answer:* About 16,560 golf facilities

- e. Predict the year in which the number of golf facilities reached 16,000. Explain how you found your answer. *Sample answer:* 2002; substitute 16 for y in the equation $y = 0.28x + 14.6$ and solve for x .

Year	Golf facilities (thousands)
1997	14.6
1998	14.9
1999	15.2
2000	15.5
2001	15.7

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7. $y - 5 = -2(x - 4)$ or
 $y - 9 = -2(x - 2)$
8. $y - 2 = -\frac{1}{2}(x + 2)$ or
 $y + 3 = -\frac{1}{2}(x - 8)$
9. $y - 4 = 5(x - 3)$ or
 $y + 6 = 5(x - 1)$
- 12a. $y = -5x + 10$
- 12b. $y = \frac{2}{5}x - \frac{2}{5}$
- 13a. $y = -x + 3$
- 13b. $y = x + 5$
- 14a. $y = \frac{1}{4}x - 10$
- 14b. $y = -4x + 7$

Additional Resources

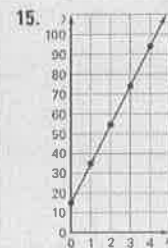
Assessment Book

- Chapter Test, Levels A, B, C, pp. 63–68
- Standardized Chapter Test, pp. 69–70
- SAT/ACT Chapter Test, pp. 71–72
- Alternative Assessment, pp. 73–74

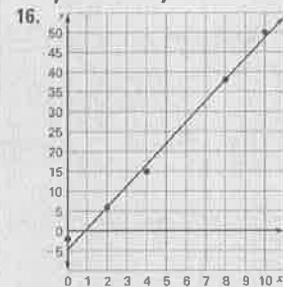
Test Generator CD-ROM

Chapter Test

Easily-readable reduced copies (with answers) of Chapter Test B, the Standardized Chapter Test, and the Alternative Assessment from the Assessment Book can be found on pp. 280F–280H.



Sample answer: $y = 19.7x + 14.8$



Sample answer: $y = 5.3x - 3.9$

