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CHAPTER REVIEW

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- Multi-Language Glossary
- Vocabulary practice

REVIEW KEY VOCABULARY

- point-slope form
- converse
- perpendicular
- scatter plot
- positive correlation, negative correlation, relatively no correlation
- line of fit
- causation
- best-fitting line
- linear regression
- interpolation
- extrapolation
- zero of a function

VOCABULARY EXERCISES

1. Copy and complete: If a best-fitting line falls from left to right, then the data have a(n) ? correlation.
2. Copy and complete: Using a linear function to approximate a value beyond a range of known values is called ?.
3. **WRITING** What is the zero of a function, and how does it relate to the function's graph? *Explain.*

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 this chapter.

4.1

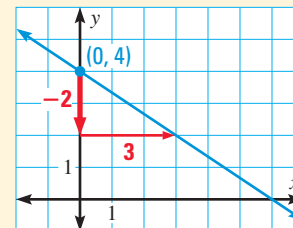
Write Linear Equations in Slope-Intercept Form

EXAMPLE

Write an equation of the line shown.

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

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



EXERCISES

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

4. slope: 3

y-intercept: -10

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

y-intercept: 5

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

y-intercept: 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?

EXAMPLES
1 and 5
for Exs. 4–7

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CHAPTER REVIEW

4.2 Use Linear Equations in Slope-Intercept Form

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. $(-3, -1); m = 4$

9. $(-2, 1); m = 1$

10. $(8, -4); m = -3$

EXAMPLE 1
for Exs. 8–10

4.3 Write Linear Equations in Point-Slope Form

EXAMPLE

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

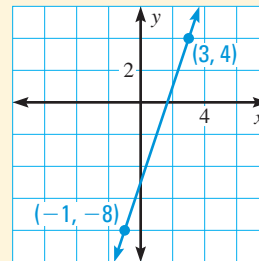
STEP 1 Find the slope of the line.

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

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

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.?

EXAMPLES 3 and 5
for Exs. 11–14

4.4 Write Linear Equations in Standard Form

EXAMPLE

Write an equation in standard form of the line shown.

$$y - y_1 = m(x - x_1)$$

Write point-slope form.

$$y - 1 = -2(x - (-1))$$

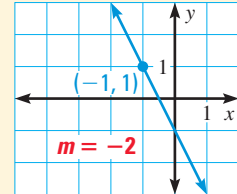
Substitute 1 for y_1 , -2 for m , and -1 for x_1 .

$$y - 1 = -2x - 2$$

Distributive property

$$2x + y = -1$$

Collect variable terms on one side, constants on the other.



EXAMPLES 2 and 5

for Exs. 15–17

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 $(3, 7)$
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.

4.5 Write Equations of Parallel and Perpendicular Lines

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.

$$y = mx + b$$

Write slope-intercept form.

$$-2 = -\frac{1}{4}(-4) + b$$

Substitute $-\frac{1}{4}$ for m , -4 for x , and -2 for y .

$$-3 = b$$

Solve for b .

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

EXAMPLES 1 and 4

for Exs. 18–20

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. $(6, 0)$, $y = \frac{3}{4}x - \frac{1}{4}$

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CHAPTER REVIEW

4.6 Fit a Line to Data

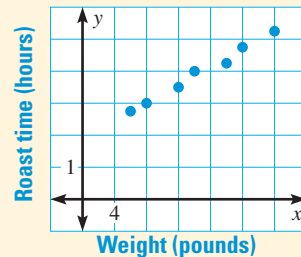
EXAMPLE

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
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.

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

4.7 Predict with Linear Models

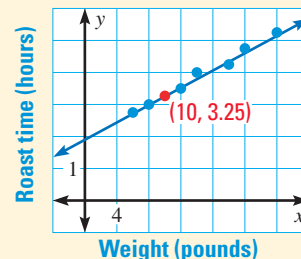
EXAMPLE

Use the scatter plot from the example for the lesson 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.



EXAMPLE 2
for Ex. 22

EXERCISES

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.