

13.1 Lesson

Key Vocabulary

measure of central tendency

Remember

Data can have one mode, more than one mode, or no mode. When each value occurs only once, there is no mode.

A **measure of central tendency** is a measure that represents the center of a data set. The *mean*, *median*, and *mode* are measures of central tendency.

Key Ideas

Mean

The *mean* of a data set is the sum of the data divided by the number of data values.

Median

Order the data. For a set with an odd number of values, the *median* is the middle value. For a set with an even number of values, the *median* is the mean of the two middle values.

Mode

The *mode* of a data set is the value or values that occur most often.

EXAMPLE 1 Finding the Mean, Median, and Mode

Students' Hourly Wages

\$3.87	\$7.25
\$8.75	\$8.45
\$8.25	\$7.25
\$6.99	\$7.99

An amusement park hires students for the summer. The students' hourly wages are given in the table. Find the mean, median, and mode of the hourly wages.

Mean: $\frac{\text{sum of the data}}{\text{number of values}} = \frac{58.8}{8} = 7.35$

Median: 3.87, 6.99, 7.25, 7.25, 7.99, 8.25, 8.45, 8.75 Order the data.

$$\frac{15.24}{2} = 7.62 \quad \text{Mean of two middle values}$$

Mode: 3.87, 6.99, 7.25, 7.25, 7.99, 8.25, 8.45, 8.75

The value 7.25 occurs most often.

∴ The mean is \$7.35, the median is \$7.62, and the mode is \$7.25.

On Your Own

- WHAT IF?** In Example 1, the park hires another student at an hourly wage of \$6.99. How does this additional value affect the mean, median, and mode? Explain.

Now You're Ready
Exercises 5–8

EXAMPLE 2 Removing an Outlier

Remember

An *outlier* is a data value that is much greater or much less than the other values.



Identify the outlier in Example 1. How does the outlier affect the mean, median, and mode?

The value \$3.87 is low compared to the other wages. It is the outlier. Find the mean, median, and mode without the outlier.

Mean: $\frac{54.93}{7} \approx 7.85$

Median: 6.99, 7.25, 7.25, **7.99**, 8.25, 8.45, 8.75 The middle value, 7.99, is the median.

Mode: 6.99, **7.25, 7.25**, 7.99, 8.25, 8.45, 8.75 The mode is 7.25.

By removing the outlier, the mean increases $\$7.85 - \$7.35 = \$0.50$, the median increases $\$7.99 - \$7.62 = \$0.37$, and the mode is the same.

EXAMPLE 3 Changing the Values of a Data Set

In Example 1, each hourly wage increases \$0.40. How does this increase affect the mean, median, and mode?

Students' Hourly Wages

\$4.27	\$7.65
\$9.15	\$8.85
\$8.65	\$7.65
\$7.39	\$8.39

Make a new table by adding \$0.40 to each hourly wage.

Mean: $\frac{62}{8} = 7.75$

Median: 4.27, 7.39, 7.65, **7.65, 8.39**, 8.65, 8.85, 9.15 Order the data.

$\frac{16.04}{2} = 8.02$ Mean of two middle values

Mode: 4.27, 7.39, **7.65, 7.65**, 8.39, 8.65, 8.85, 9.15 The mode is 7.65.

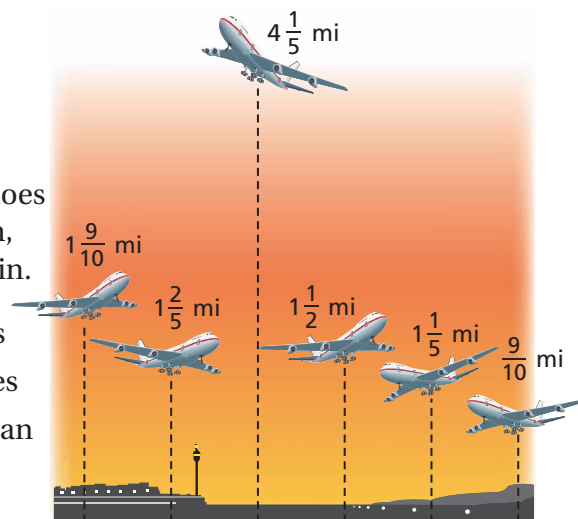
By increasing each hourly wage \$0.40, the mean, median, and mode all increase \$0.40.

On Your Own

Now You're Ready
Exercises 16 and 17

The figure shows the altitudes of several airplanes.

- Identify the outlier. How does the outlier affect the mean, median, and mode? Explain.
- Each airplane increases its altitude $1\frac{1}{2}$ miles. How does this affect the mean, median and mode? Explain.



13.1 Exercises

Vocabulary and Concept Check

- VOCABULARY** Can a data value be an outlier *and* a measure of central tendency of the same data set? Explain.
- OPEN-ENDED** Create a data set that has more than one mode.
- WRITING** Describe how removing an outlier from a data set affects the mean of the data set.

Practice and Problem Solving

4. Draw a line plot of the data. Then find the mean, median, and mode of the data.

Bag	1	2	3	4	5	6	7	8	9
Strawberries	10	13	11	15	8	14	7	11	12

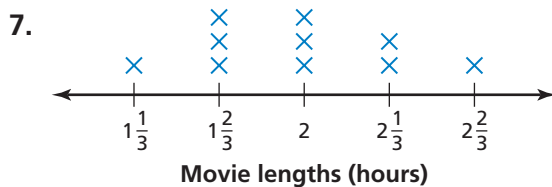
Find the mean, median, and mode of the data.

1 5.

Golf Scores		
3	-2	1
6	4	-1
-3	-1	2

6.

Changes in Stock Value (dollars)			
1.05	2.03	-1.78	-2.41
-2.64	0.67	4.02	1.39
0.66	-0.38	-3.01	2.20



8. Available Memory

Stem	Leaf
6	5
7	0 5 5
8	0 4 5
9	4

Key: 7|5 = 75 megabytes

9. **ERROR ANALYSIS** Describe and correct the error in finding the median.

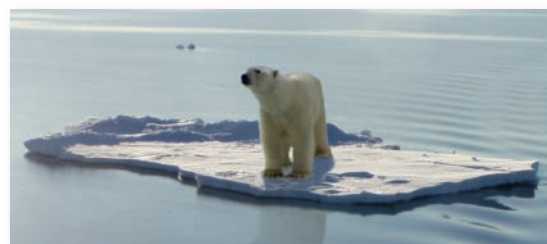


Test scores: 98, 90, 80, 80, 90, 90

The median is $\frac{528}{6} = 88$.

10. **POLAR BEARS** The table shows the masses of eight polar bears. Find the mean, median, and mode of the masses.

Masses (kilograms)			
455	262	471	358
364	553	352	467



Find the value of x .

11. Mean is 6; 2, 8, 9, 7, 6, x

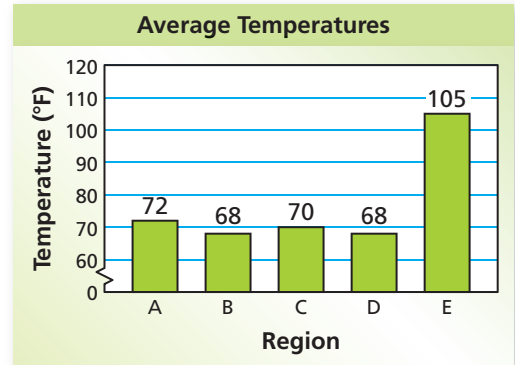
12. Mean is 0; 11.5, 12.5, -10 , -7.5 , x

13. Median is 14; 9, 10, 12, x , 20, 25

14. Median is 51; 30, 45, x , 100

2 15. **TEMPERATURES** An environmentalist records the average temperatures of five regions.

- Identify the outlier.
- Which measure of central tendency will be most affected by removing the outlier?



16. **RIVER** The Suwannee River Trail has 11 segments in Florida. The lengths (in miles) of the segments are 8.9, 9.7, 6, 2.2, 19.6, 15, 7.6, 0.5, 14.2, 14.6, and 22.4.

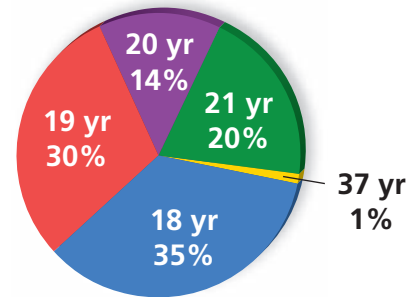
- Find the mean, median, and mode of the lengths.
- A canoeist skips the first segment of the trail. How does this affect the mean, median, and mode of the remaining lengths? Explain.

3 17. **REASONING** The value of each stock in Exercise 6 decreases \$0.05. How does this affect the mean, median, and mode? Explain.

18. **Critical Thinking** The circle graph shows the ages of 200 students in a college psychology class.

- Find the mean, median, and mode of the students' ages.
- Identify the outliers. How do the outliers affect the mean, median, and mode?

College Student Ages



Fair Game Review what you learned in previous grades & lessons

Order the values from least to greatest.

19. 1, -3 , -8 , 4, 7, -5

20. 1.2, -2.8 , $\frac{3}{2}$, 5.4, -4.7 , $-\frac{2}{3}$

21. **MULTIPLE CHOICE** Which equation represents a linear function?

(A) $y = x^2$

(B) $y = 2x$

(C) $y = \frac{2}{x}$

(D) $xy = 2$

13.2 Lesson

Key Vocabulary

box-and-whisker plot
quartiles

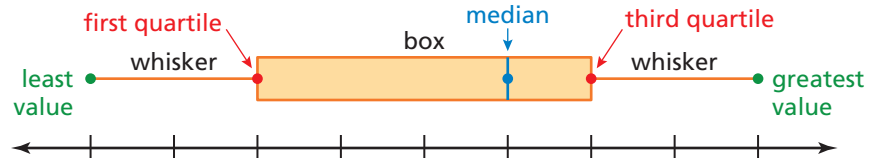
Study Tip

A box-and-whisker plot shows the *variability* of a data set.

Key Idea

Box-and-Whisker Plot

A **box-and-whisker plot** displays a data set along a number line using medians. **Quartiles** divide the data set into four equal parts. The median (second quartile) divides the data set into two halves. The median of the lower half is the first quartile. The median of the upper half is the third quartile.



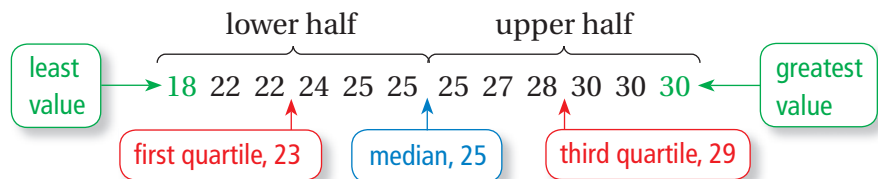
EXAMPLE 1 Making a Box-and-Whisker Plot



Make a box-and-whisker plot for the ages of the members of the 2008 U.S. women's wheelchair basketball team.

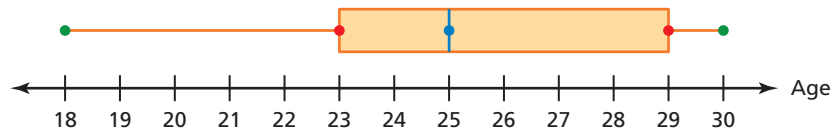
24, 30, 30, 22, 25, 22, 18, 25, 28, 30, 25, 27

Step 1: Order the data. Find the median and the quartiles.



Step 2: Draw a number line that includes the least and greatest values. Graph points above the number line for the least value, greatest value, median, first quartile, and third quartile.

Step 3: Draw a box using the quartiles. Draw a line through the median. Draw whiskers from the box to the least and greatest values.



On Your Own

- A basketball player scores 14, 16, 20, 5, 22, 30, 16, and 28 points during a tournament. Make a box-and-whisker plot for the points scored by the player.

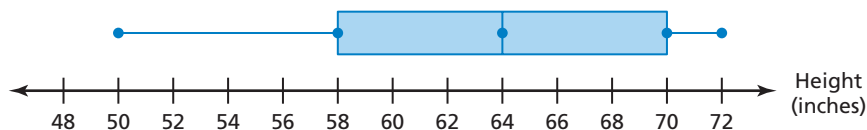
Now You're Ready
Exercises 5–7

EXAMPLE 2 Interpreting a Box-and-Whisker Plot

Study Tip

A long whisker or box indicates data is more spread out.

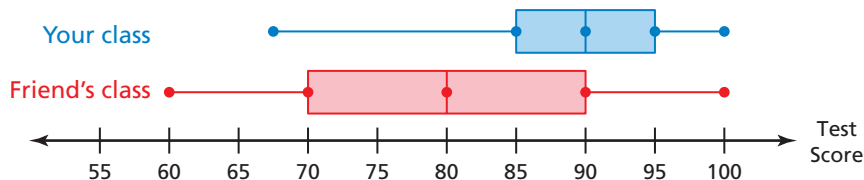
What does the box-and-whisker plot tell you about the data?



- The left whisker is longer than the right whisker. So, the data are more spread out below the first quartile than above the third quartile.
- The range of the data is $72 - 50 = 22$ inches.

EXAMPLE 3 Standardized Test Practice

Which statement is true about the double box-and-whisker plot?



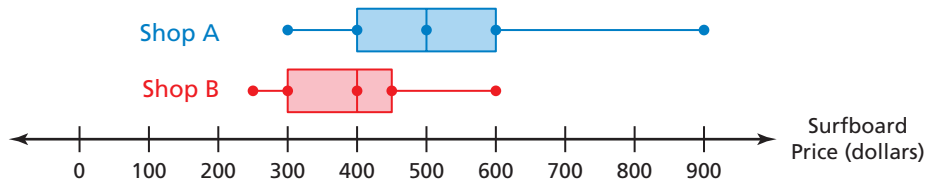
- Ⓐ Half of the test scores in your class are between 85 and 100.
- Ⓑ 25% of the test scores in your friend's class are 80 or above.
- Ⓒ The medians are the same for both classes.
- Ⓓ The test scores in your friend's class are more spread out than the test scores in your class.

The range of the test scores in your class is less than the range in your friend's class. Also, the box for your friend's class is longer than the box for your class. So, the test scores in your friend's class are more spread out than the test scores in your class.

⋮ The correct answer is Ⓓ.

On Your Own

2. Compare the surfboard prices of Shop A and Shop B. What are three conclusions you can make from the double box-and-whisker plot?



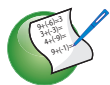
Now You're Ready
Exercise 10

13.2 Exercises



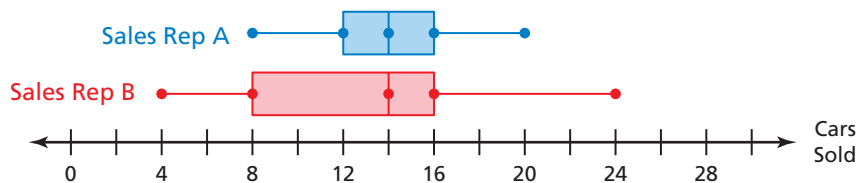
Vocabulary and Concept Check

- VOCABULARY** In a box-and-whisker plot, what percent of the data is represented by each whisker? the box?
- WRITING** Describe how to find the first quartile of a data set.
- NUMBER SENSE** What does the length of the box-and-whisker plot tell you about the data?



Practice and Problem Solving

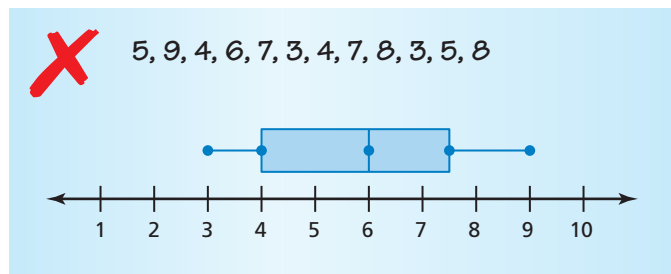
- The box-and-whisker plots show the monthly car sales for a year for two sales representatives. Compare and contrast the sales of the two representatives.



Make a box-and-whisker plot for the data.

- Hours of television watched: 0, 3, 4, 5, 3, 4, 6, 5
 - Lengths (in inches) of cats: 16, 18, 20, 25, 17, 22, 23, 21
 - Elevations (in feet): -2, 0, 5, -4, 1, -3, 2, 0, 2, -3, 6, -1

- ERROR ANALYSIS** Describe and correct the error in making a box-and-whisker plot for the data.



- FISH** The lengths (in inches) of the fish caught on a fishing trip are 9, 10, 12, 8, 13, 10, 12, 14, 7, 14, 8, and 14. Make a box-and-whisker plot for the data. What is the range of the data?
- INCHWORM** The table shows the lengths of 12 inchworms. Make a box-and-whisker plot for the data. What does the box-and-whisker plot tell you about the data?



Length (cm)	2.5	2.4	2.3	2.5	2.7	2.1	2.8	2.6	2.1	2.6	2.9	2.0
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11. **CALORIES** The table shows the number of calories burned per hour for nine activities.

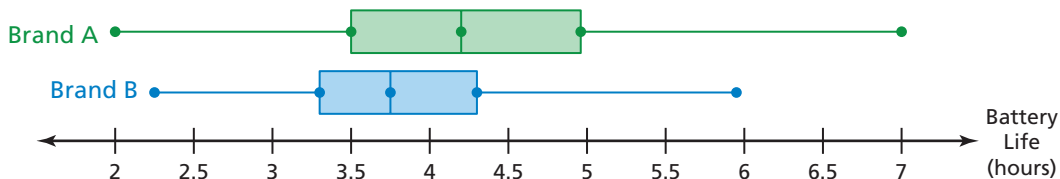
- Make a box-and-whisker plot for the data.
- Identify the outlier.
- Make another box-and-whisker plot without the outlier.
- WRITING** Describe how the outlier affects the whiskers, the box, and the quartiles of the box-and-whisker plot.

Calories Burned per Hour	
Fishing	207
Mowing the lawn	325
Canoeing	236
Bowling	177
Hunting	295
Fencing	354
Bike racing	944
Horseback riding	236
Dancing	266



12. **CELL PHONES** The double box-and-whisker plot compares the battery life (in hours) of two brands of cell phones.

- What is the range of the upper 75% of each brand?
- Which battery has a longer battery life? Explain.



Create a set of data values whose box-and-whisker plot has the given characteristic(s).

- The least value, greatest value, quartiles, and median are all equally spaced.
- Both whiskers are the same length as the box.
- The box between the median and the first quartile is three times as long as the box between the median and the third quartile.
- There is no right whisker.



Fair Game Review what you learned in previous grades & lessons

Write an equation of the line that passes through the points.

17. $(-4, -10), (2, 8)$

18. $(-3, 3), (0, -1)$

19. $(-4, 1), (4, -1)$

20. $(6, 7), (8, 8)$

21. **MULTIPLE CHOICE** You run 10 feet per second. What is this rate in miles per hour?

(A) 0.11 mi/h

(B) 6.82 mi/h

(C) 10.23 mi/h

(D) 14.67 mi/h

13 Study Help

You can use a **word magnet** to organize information associated with a vocabulary word. Here is an example of a word magnet for measures of central tendency.

Mean: sum of the data divided by the number of data values

Median: middle value of an ordered data set

Mode: value(s) that occur(s) most often

Example: 1, 2, 2, 3, 4
Mean: $\frac{12}{5} = 2.4$
Median: 2
Mode: 2

Measures of Central Tendency

For an odd number of values, the median is the middle value.

For an even number of values, the median is the mean of the two middle values.

Data can have one mode, more than one mode, or no mode.

Example: 1, 2, 3, 4, 5, 6
Mean: $\frac{21}{6} = 3.5$
Median: $\frac{7}{2} = 3.5$
Mode: none

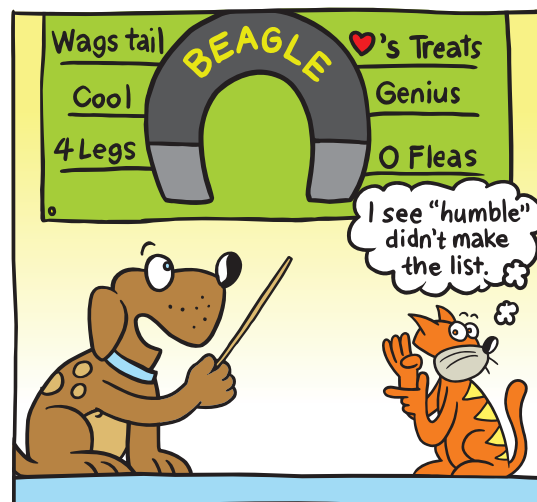
On Your Own

Make a word magnet to help you study these topics.

1. outliers
2. box-and-whisker plots

After you complete this chapter, make word magnets for the following topics.

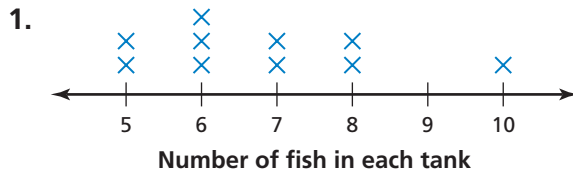
3. scatter plots
4. lines of best fit
5. data displays



"How do you like the **word magnet** I made for 'Beagle'?"

13.1–13.2 Quiz

Find the mean, median, and mode of the data.



2.

Checkbook Balances (dollars)		
40	10	-20
0	-10	40
30	40	50

3.

Hours Spent on Project		
$3\frac{1}{2}$	5	$2\frac{1}{2}$
3	$3\frac{1}{2}$	$\frac{1}{2}$

4. Students in a Grade

Stem	Leaf
9	4 9
10	1 2 6
11	3 3
12	0

Key: 10|6 = 106 students

Make a box-and-whisker plot for the data.

5. Hours spent on each babysitting job: 2, 4, 7, 5, 4, 1, 7, 4

6. Minutes of violin practice: 20, 50, 60, 40, 40, 30, 60, 40, 50, 20, 20, 35

7. Players' scores at end of first round: 200, -100, 100, 350, -50, 0, -50, 300

8. The table shows the prices of eight acoustic guitars at a music store.

Prices of Acoustic Guitars (dollars)			
650	225	320	615
595	495	200	110

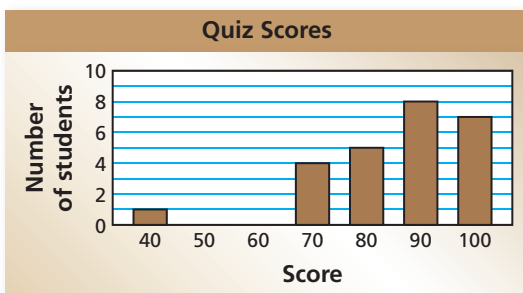
a. Find the mean, median, and mode of the prices.

b. The store gets a ninth guitar in stock. The guitar costs \$615. How does this additional value affect the mean, median, and mode of the data?

9. **ANOLES** The table shows the lengths of 12 green anoles. Make a box-and-whisker plot for the data. What does the box-and-whisker plot tell you about the data?



Length (cm)	17.5	17.3	16.5	16.8	17.0	16.5	17.0	16.7	16.5	17.0	17.4	17.1
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10. **QUIZ SCORES** The graph shows the quiz scores of students in a class.

a. Identify the outlier.

b. Which measure of central tendency will be most affected by removing the outlier? Explain.

13.3 Lesson

Key Vocabulary

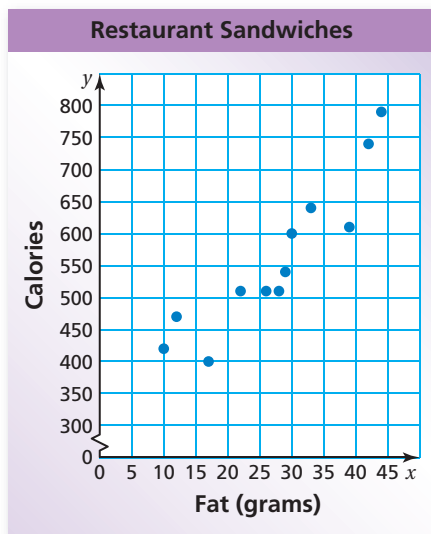
scatter plot
line of best fit

Key Idea

Scatter Plot

A **scatter plot** is a graph that shows the relationship between two data sets. The two sets of data are graphed as ordered pairs in a coordinate plane.

EXAMPLE 1 Interpreting a Scatter Plot



The scatter plot at the left shows the total fat (in grams) and the total calories in 12 restaurant sandwiches.

- a. How many calories are in the sandwich that contains 17 grams of fat?

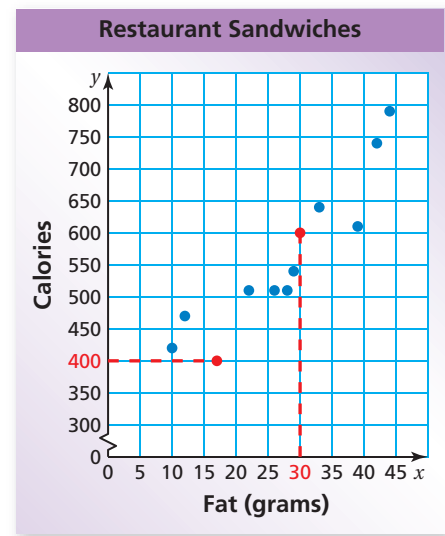
Draw a horizontal line from the point that has an x -value of 17. It crosses the y -axis at 400.

∴ So, the sandwich has 400 calories.

- b. How many grams of fat are in the sandwich that contains 600 calories?

Draw a vertical line from the point that has a y -value of 600. It crosses the x -axis at 30.

∴ So, the sandwich has 30 grams of fat.



- c. What tends to happen to the number of calories as the number of grams of fat increases?

Looking at the graph, the plotted points go up from left to right.

∴ So, as the number of grams of fat increases, the number of calories increases.

On Your Own

1. **WHAT IF?** A sandwich has 650 calories. Based on the scatter plot in Example 1, how many grams of fat would you expect the sandwich to have? Explain your reasoning.

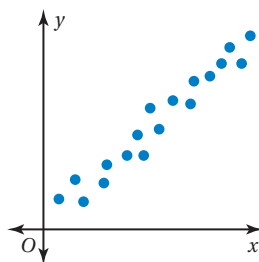
Now You're Ready
Exercises 4 and 5

A scatter plot can show that a relationship exists between two data sets.

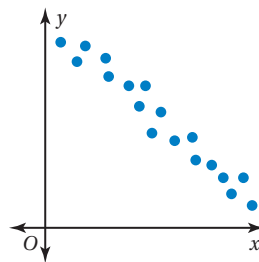
Positive Relationship

Negative Relationship

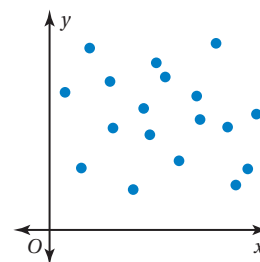
No Relationship



As x increases, y increases.



As x increases, y decreases.



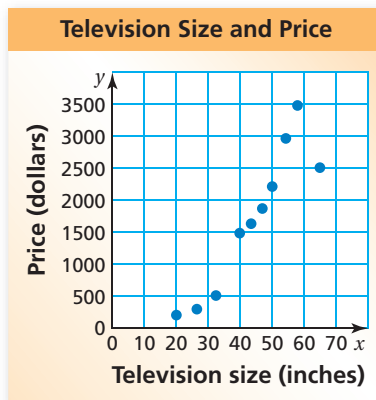
The points show no pattern.

EXAMPLE 2 Identifying a Relationship

Tell whether the data show a *positive*, a *negative*, or *no* relationship.

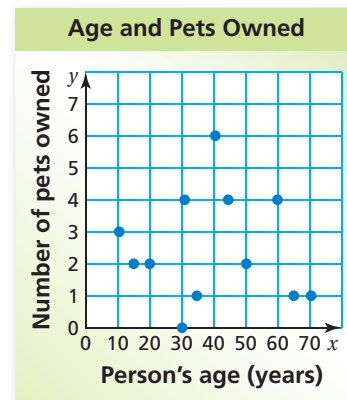
a. Television size and price

b. Age and number of pets owned



As the size of the television increases, the price increases.

∴ So, the scatter plot shows a positive relationship.



The number of pets owned does not depend on a person's age.

∴ So, the scatter plot shows no relationship.

On Your Own

Now You're Ready
Exercises 6–8

Make a scatter plot of the data. Tell whether the data show a *positive*, a *negative*, or *no* relationship.

2.

Study Time (min), x	30	20	60	90	45	10	30	75	120	80
Test Score, y	87	74	92	97	85	62	83	90	95	91

3.

Age of a Car (years), x	1	2	3	4	5	6	7	8
Value (thousands), y	\$24	\$21	\$19	\$18	\$15	\$12	\$8	\$7

A **line of best fit** is a line drawn on a scatter plot that is close to most of the data points. It can be used to estimate data on a graph.

EXAMPLE 3 Finding a Line of Best Fit

Week, x	Sales (millions), y
1	\$19
2	\$15
3	\$13
4	\$11
5	\$10
6	\$8
7	\$7
8	\$5

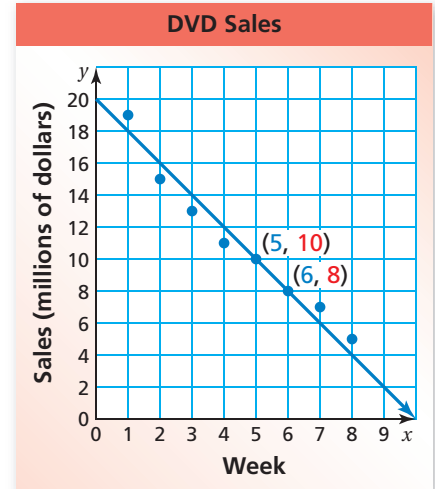
The table shows the weekly sales of a DVD and the number of weeks since its release. (a) Make a scatter plot of the data. (b) Draw a line of best fit. (c) Write an equation of the line of best fit. (d) Predict the sales in week 9.

- Plot the points in a coordinate plane. The scatter plot shows a negative relationship.
- Draw a line that is close to the data points. Try to have as many points above the line as below it.
- The line passes through (5, 10) and (6, 8).

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{-2}{1} = -2$$

Because the line crosses the y -axis at (0, 20), the y -intercept is 20.

∴ So, the equation of the line of best fit is $y = -2x + 20$.



- To predict the sales for week 9, substitute 9 for x in the equation of the line of best fit.

$$\begin{aligned} y &= -2x + 20 && \text{Line of best fit} \\ &= -2(9) + 20 && \text{Substitute 9 for } x. \\ &= 2 && \text{Evaluate.} \end{aligned}$$

∴ The sales in week 9 should be about \$2 million.

Study Tip

A line of best fit does not need to pass through any of the data points.

On Your Own

- The table shows the number of people who have attended a neighborhood festival over an 8-year period.

Year, x	1	2	3	4	5	6	7	8
Attendance, y	420	500	650	900	1100	1500	1750	2400

- Make a scatter plot of the data.
- Draw a line of best fit.
- Write an equation of the line of best fit.
- Predict the number of people who will attend the festival in year 10.

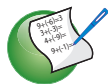
Now You're Ready
Exercise 11

13.3 Exercises



Vocabulary and Concept Check

- VOCABULARY** What type of data are needed to make a scatter plot? Explain.
- WRITING** Explain why a line of best fit is helpful when analyzing data.

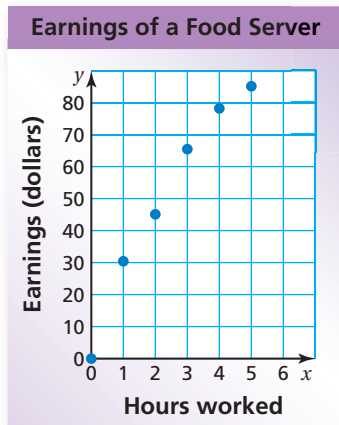
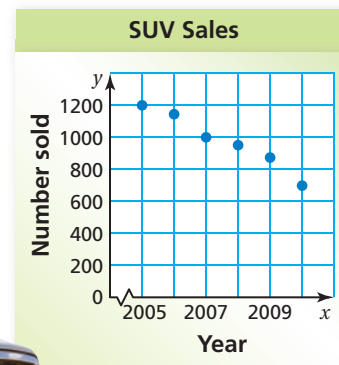


Practice and Problem Solving

- BLUEBERRIES** The table shows the weights y of x pints of blueberries.

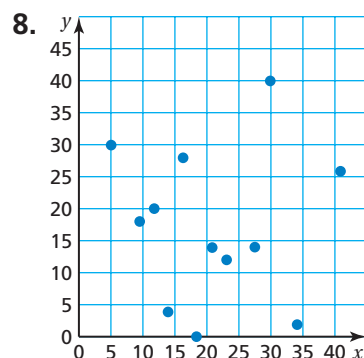
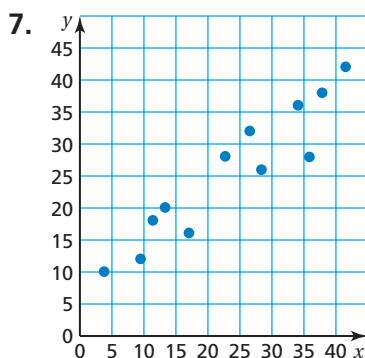
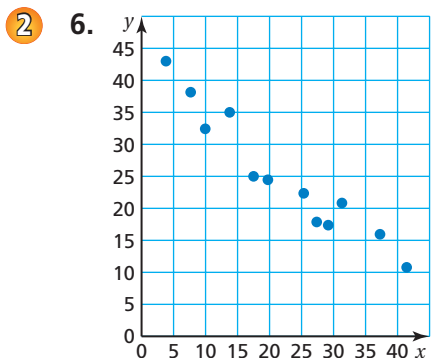
Number of Pints, x	0	1	2	3	4	5
Weight (pounds), y	0	0.8	1.50	2.20	3.0	3.75

- Graph the data in the table.
 - Draw the straight line that you think best approximates the points.
 - Write an equation of the line you drew.
 - Use the equation to predict the weight of 10 pints of blueberries.
 - Blueberries cost \$2.25 per pound. How much do 10 pints of blueberries cost?
- SUVS** The scatter plot shows the number of sport utility vehicles sold in a city from 2005 to 2010.
 - In what year were 1000 SUVs sold?
 - About how many SUVs were sold in 2009?
 - Describe the relationship shown by the data.



- EARNINGS** The scatter plot shows the total earnings (wages and tips) of a food server during 1 day.
 - About how many hours must the server work to earn \$70?
 - About how much did the server earn for 5 hours of work?
 - Describe the relationship shown by the data.

Tell whether the data show a *positive*, a *negative*, or *no* relationship.



9. **HONEYBEES** The table shows the number of honeybee colonies in the United States from 2003 to 2006. What type of relationship do the data show?



Year, x	2003	2004	2005	2006
Honeybee Colonies (millions), y	2.599	2.556	2.413	2.392

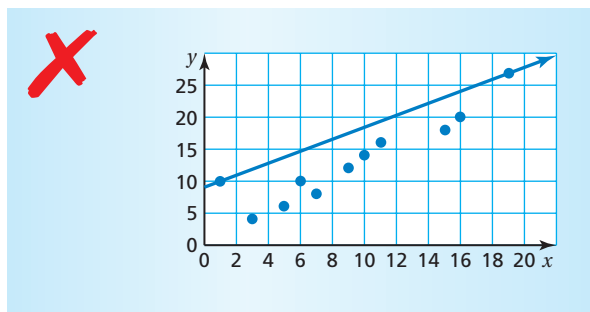
10. **OPEN-ENDED** Describe a set of real-life data that has a positive relationship.

3 11. **VACATION** The table shows the distance you travel over a 6-hour period.

- Make a scatter plot of the data.
- Draw a line of best fit.
- Write an equation of the line of best fit.
- Predict the distance you will travel in 7 hours.

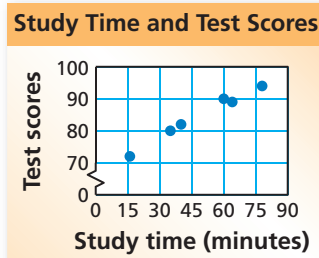
Hours, x	Distance (miles), y
1	62
2	123
3	188
4	228
5	280
6	344

12. **ERROR ANALYSIS** Describe and correct the error in drawing the line of best fit.



13. **TEST SCORES** The scatter plot shows the relationship between the number of minutes spent studying and the test scores for a science class.

- What type of relationship does the data show?
- Interpret the relationship.



14. **REASONING** A data set has no relationship. Is it possible to find the line of best fit for the data? Explain.

15. **PROJECT** Use a ruler or a yardstick to find the height and arm span of three people.

- Make a scatter plot using the data you collected. Then draw the line of best fit for the data.
- Use your height and the line of best fit to predict your arm span.
- Measure your arm span. Compare the result with your prediction in part (b).
- Is there a relationship between a person's height x and arm span y ? Explain.



16. **Critical Thinking** The table shows the price of admission to a local theater and the yearly attendance for several years.

Price of Admission (dollars), x	Yearly Attendance, y
19.50	50,000
21.95	48,000
23.95	47,500
24.00	40,000
24.50	45,000
25.00	43,500

- Identify the outlier.
- How does the outlier affect the line of best fit? Explain.
- Make a scatter plot of the data and draw the line of best fit.
- Use the line of best fit to predict the attendance when the admission cost is \$27.



Fair Game Review what you learned in previous grades & lessons

Use a graph to solve the equation. Check your solution.

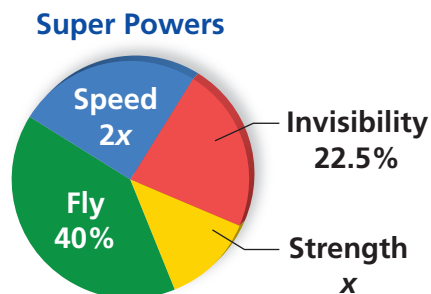
17. $5x = 2x + 6$

18. $7x + 3 = 9x - 13$

19. $\frac{2}{3}x = -\frac{1}{3}x - 4$

20. **MULTIPLE CHOICE** The circle graph shows the super powers chosen by a class. What percent of the students want strength as their super power?

- | | |
|-----------|-----------|
| (A) 10.5% | (B) 12.5% |
| (C) 15% | (D) 25% |



13.4 Lesson

Key Idea

Data Display

Pictograph

What does it do?

shows data using pictures



Bar Graph

shows data in specific categories



Circle Graph

shows data as parts of a whole



Line Graph

shows how data change over time



Histogram

shows frequencies of data values in intervals of the same size



Stem-and-Leaf Plot

orders numerical data and shows how they are distributed



Box-and-Whisker Plot

shows the variability of a data set using quartiles



Line Plot

shows the number of times each value occurs in a data set



Scatter Plot

shows the relationship between two data sets using ordered pairs in a coordinate plane



EXAMPLE 1 Choosing an Appropriate Data Display

Choose an appropriate data display for the situation. Explain your reasoning.

- the number of students in a marching band each year
 - A line graph shows change over time. So, a line graph is an appropriate data display.
- comparison of people's shoe sizes and their heights
 - You want to compare two different data sets. So, a scatter plot is an appropriate data display.

On Your Own

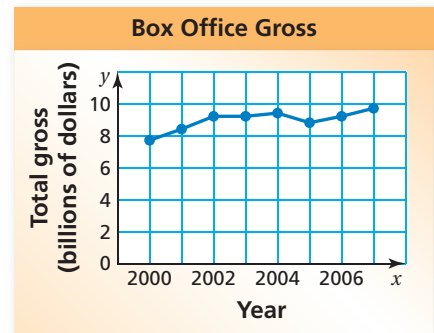
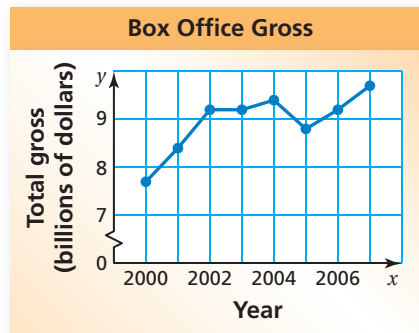
Choose an appropriate data display for the situation. Explain your reasoning.

- the population of Florida divided into age groups
- the percents of students in your school who speak Spanish, French, or Haitian Creole

Now You're Ready
Exercises 4–7

EXAMPLE 2 Identifying a Misleading Data Display

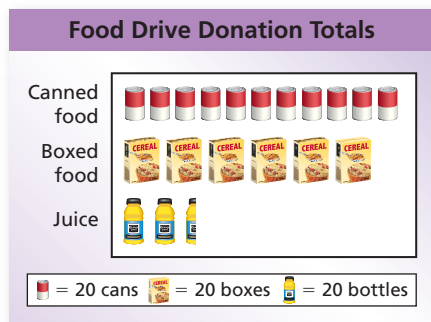
Which line graph is misleading? Explain.



The vertical axis of the line graph on the left has a break (ζ) and begins at 7. This graph makes it appear that the total gross increased rapidly from 2000 to 2004. The graph on the right has an unbroken axis. It is more honest and shows that the total gross increased slowly.

So, the graph on the left is misleading.

EXAMPLE 3 Analyzing a Misleading Data Display



A volunteer concludes that the number of cans of food and boxes of food donated were about the same. Is this conclusion accurate? Explain.

Each icon represents the same number of items. Because the box icon is larger than the can icon, it looks like the number of boxes is about the same as the number of cans, but the number of boxes is actually about half of the number of cans.

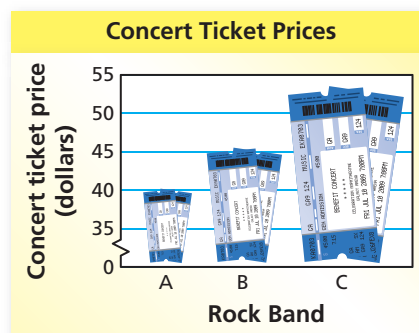
So, the conclusion is not accurate.

On Your Own

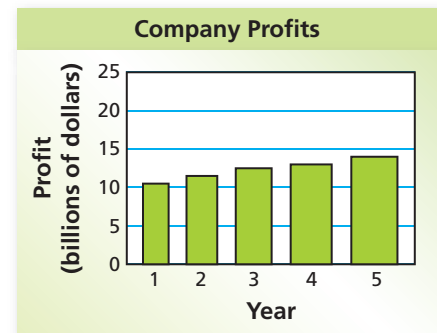
Now You're Ready
Exercises 9–12

Explain why the data display is misleading.

3.



4.



13.4 Exercises

Vocabulary and Concept Check

- REASONING** Can more than one display be appropriate for a data set? Explain.
- OPEN-ENDED** Describe how a histogram can be misleading.

Practice and Problem Solving

- Analyze and display the data in a way that best describes the data. Explain your choice of display.

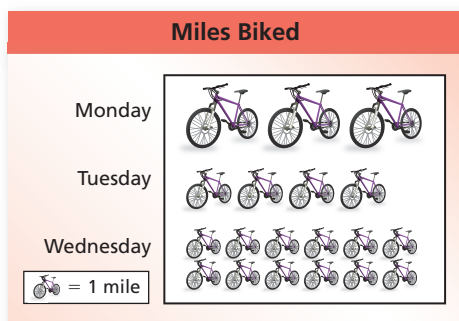
Notebooks Sold in One Week				
192 red	170 green	203 black	183 pink	230 blue
165 yellow	210 purple	250 orange	179 white	218 other

Choose an appropriate data display for the situation. Explain your reasoning.

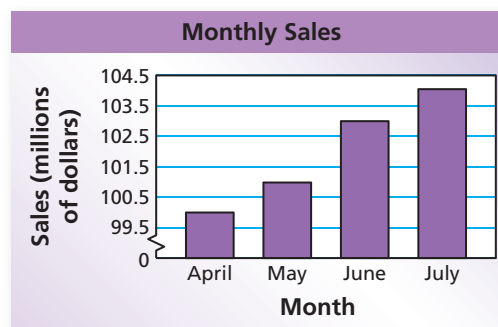
- a student's test scores and how the scores are spread out
 - the distance a person drives each month
 - the outcome of rolling a number cube
 - homework problems assigned each day
- WRITING** When would you choose a histogram instead of a bar graph to display data?

Explain why the data display is misleading.

2 3 9.



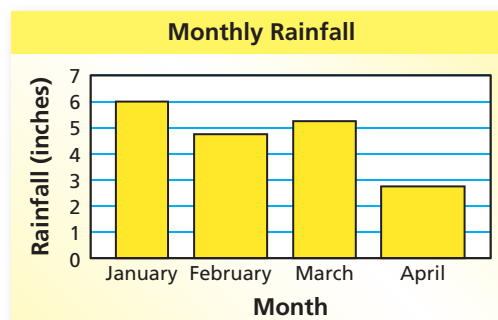
10.



11.

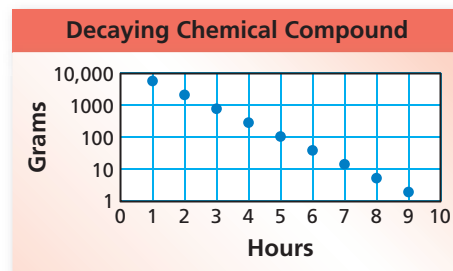


12.



13. **VEGETABLES** A nutritionist wants to use a data display to show the favorite vegetables of the students at a school. Choose an appropriate data display for the situation. Explain your reasoning.

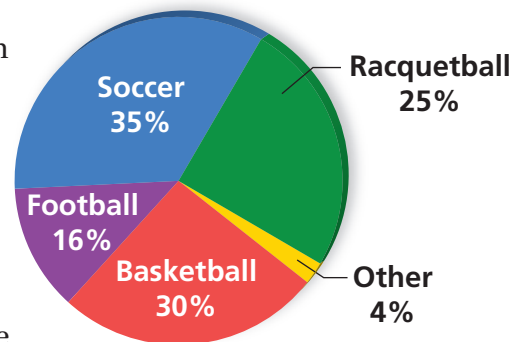
14. **CHEMICALS** A scientist gathers data about a decaying chemical compound. The results are shown in the scatter plot. Is the data display misleading? Explain.



15. **REASONING** What type of data display is appropriate for showing the mode of a data set?

16. **SPORTS** A survey asked 100 students to choose their favorite sports. The results are shown in the circle graph.

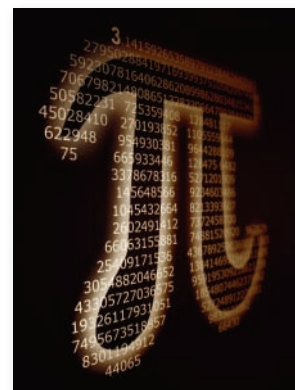
Favorite Sports



- Explain why the graph is misleading.
- What type of data display would be more appropriate for the data? Explain.



17. **Critical Thinking** With the help of computers, mathematicians have computed and analyzed billions of digits of the irrational number π . One of the things they analyze is the frequency of each of the numbers 0 through 9. The table shows the frequency of each number in the first 100,000 digits of π .



- Display the data in a bar graph.
- Display the data in a circle graph.
- Which data display is more appropriate? Explain.
- Describe the distribution.

Number	0	1	2	3	4	5	6	7	8	9
Frequency	9999	10,137	9908	10,025	9971	10,026	10,029	10,025	9978	9902



Fair Game Review what you learned in previous grades & lessons

Write the verbal statement as an equation.

18. A number plus 3 is 5.

19. 8 times a number is 24.

20. **MULTIPLE CHOICE** What is 20% of 25% of 400?

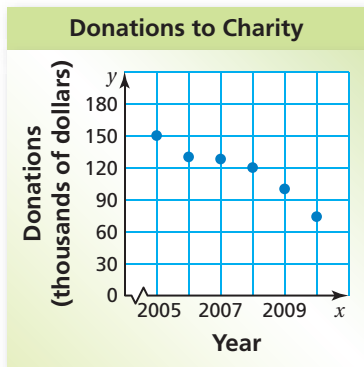
(A) 20

(B) 200

(C) 240

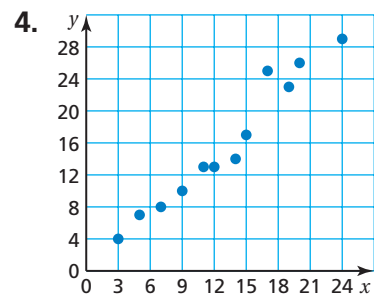
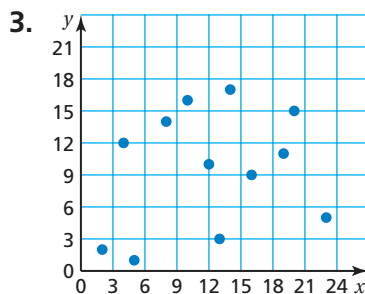
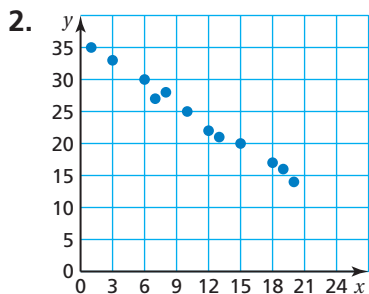
(D) 380

13.3–13.4 Quiz



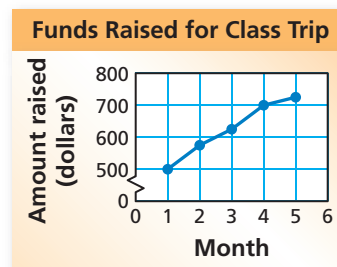
- The scatter plot shows the number of donations a charity received from 2005 to 2010.
 - In what year did the charity receive \$150,000?
 - How much did the charity receive in 2008?
 - Describe the relationship shown by the data.

Tell whether the data show a *positive*, a *negative*, or *no* relationship.



Choose an appropriate data display for the situation. Explain your reasoning.

- percent of band students in each section
- company's profit for each week
- FUNDRAISER** The graph shows the amount of money that the eighth-grade students at a school raised each month to pay for the class trip. Is the data display misleading? Explain.



- CATS** The table shows the number of cats adopted from an animal shelter each month.
 - Make a scatter plot of the data.
 - Draw a line of best fit.
 - Write an equation of the line of best fit.
 - Predict how many cats will be adopted in month 10.

Month	1	2	3	4	5	6	7	8	9
Cats	3	6	7	11	13	14	15	18	19



13 Chapter Test

Find the mean, median, and mode of the data.

1. **Distances (feet) Above or Below Water Level in Pool**

-3	0	-3
3	10	0
11	-6	-3

2. **Cooking Time (minutes)**

Stem	Leaf
3	5 8
4	0 1 8
5	0 4 4 4 5 9
6	0

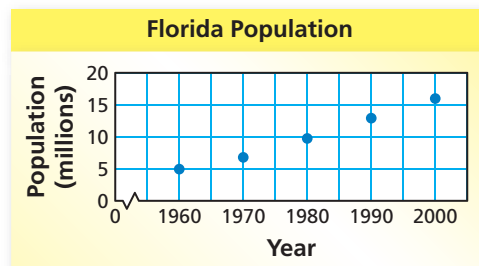
Key: 4 | 1 = 41 minutes

Make a box-and-whisker plot for the data.

3. Ages (in years) of dogs at a vet's office: 1, 3, 5, 11, 5, 7, 5, 9
4. Lengths (in inches) of fish in a pond: 12, 13, 7, 8, 14, 6, 13, 10
5. Hours practiced each week: 7, 6, 5, 4.5, 3.5, 7, 7.5, 2, 8, 7, 7.5, 6.5

6. **POPULATION** The graph shows the population (in millions) of Florida from 1960 to 2000.

- In what year was the population of Florida about 5 million?
- What was the approximate population of Florida in 1990?
- Describe the relationship shown by the data.



Choose an appropriate data display for the situation. Explain your reasoning.

7. magazine sales grouped by price
8. distance a person hikes each week
9. **ALLIGATORS** The table shows the lengths of 12 alligators. Make a box-and-whisker plot of the data. What does the box-and-whisker plot tell you about the data?

Length (meters)	2.0	1.9	2.2	2.8	3.0	2.0	2.2	3.0	2.5	1.8	2.1	3.0
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10. **REASONING** Name two types of data displays that are appropriate for showing the median of a data set.

11. **NEWBORNS** The table shows the lengths and weights of several newborn babies.

- Make a scatter plot of the data.
- Draw the line of best fit.
- Write an equation of the line of best fit.
- Use the equation to predict the weight of a newborn that is 19.75 inches long.

Length (inches)	Weight (pounds)
19	6
19.5	7
20	7.75
20.25	8.5
20.5	8.5
22.5	11