Chapter 9

Name_____ Date _____

Chapter 9 Data Analysis and Displays

Dear Family,

Volunteering is a rewarding way to spend time with friends and family while helping your community.

Many charitable and non-profit organizations require a lot of management—as much as, or more than some businesses that operate for profit. Managers must raise money through donations and recruit volunteers—both of which involve convincing people of the value of supporting the organization. Organizations often use marketing campaigns and community presentations to promote their causes.

With your student, decide on a volunteer opportunity to explore. Take a look at a number of organizations. Do research on the Internet, attend community presentations, and view the organization's marketing material to learn as much as you can. Have your student analyze the data presented.

- What numerical data did the organization present? Are they the best measurements for the data?
- Did the organization use data displays? Did they use the best types of displays to make their point? If not, what would be a better display? Why?
- Does the volunteer opportunity fit your abilities and schedule?

If your analysis leaves you with questions, you and your student should contact the volunteer coordinator at the organization. After analyzing each organization, compare each opportunity to find one that is the best fit for you.

Not every volunteer effort requires a long-term commitment. Often, a community group will organize a neighborhood beautification or cleanup project. Talk with your student about how they would get such a project started. What kind of data would your student present to convince people to volunteer? Would your family like to put the plan into motion?

May you have a cause to celebrate!

Nombre _____ Fecha _____

Capítulo 9 Análisis de datos y representaciones de datos

Estimada Familia:

El voluntariado es una manera gratificante de pasar tiempo con sus amigos y familia mientras ayuda a su comunidad.

Muchas organizaciones de caridad y sin fines de lucro requieren muchos recursos administrativos—tanto o más que los negocios en sí. Los administradores deben recaudar fondos a través de donaciones y reclutar voluntarios—ambos requieren convencer a las personas sobre la importancia de apoyar a la organización. Las organizaciones generalmente utilizan campañas de mercadeo y presentaciones a la comunidad para promover sus causas.

Con su estudiante, decidan explorar una oportunidad de voluntariado. Examinen un número de organizaciones. Hagan investigaciones en Internet, vayan a presentaciones en la comunidad y revisen el material de mercadeo de la organización para aprender lo más que puedan. Haga que su estudiante analice los datos presentados.

- ¿Qué datos numéricos presentó la organización? ¿Estas son las mejores medidas para los datos?
- ¿La organización utilizó representaciones de datos? ¿Usaron los mejores tipos de representaciones para explicar su mensaje? Si no, ¿qué representación sería mejor? ¿Por qué?
- ¿La oportunidad de voluntariado se ajusta a sus habilidades y horarios?

Si su análisis le deja interrogantes, usted y su estudiante deben contactar a la coordinador de voluntarios de la organización. Luego de analizar cada organización, comparen cada oportunidad para encontrar aquélla que mejor se adapte a ustedes.

No todos los voluntariados requieren un compromiso a largo plazo. A menudo un grupo en la comunidad organiza el embellecimiento del barrio o inicia un proyecto de limpieza. Hable con su alumno acerca de cómo ellos pueden iniciar un proyecto de esa naturaleza. ¿Qué tipo de información presentaría su estudiante para convencer a las personas para hacer un voluntariado? ¿A su familia le gustaría llevar a cabo esta iniciativa?

¡Que tengan una causa para celebrar!

Activity 9.1 Start Thinking!

For use before Activity 9.1

Sketch a graph of the data shown in the table. Choose appropriate titles.

Person	1	2	3	4	5	6
Number of Shoes	13	5	25	10	33	17

Activity 9.1 Warm Up

For use before Activity 9.1

Plot the point in a coordinate plane.

1. $(1, 6)$

2. $(4, 3)$

3. $(0, 4)$

4. $(5, 2)$

5. $(3, 3)$

6. $(5, 0)$

Lesson 9.1 Start Thinking!

For use before Lesson 9.1

Explain to a partner what it means for a scatter plot to have a *positive* relationship.

Explain to a partner what it means for a scatter plot to have a *nonlinear* relationship.

Lesson 9.1 Warm Up

For use before Lesson 9.1

1. The table shows the average price (in dollars) of sweatshirts sold at different stores and the number of sweatshirts sold at each store in one month.

Average Price	25	38	32	35	50
Number Sold	150	90	142	115	75

a. Write the ordered pairs from the table and plot them in a coordinate plane.

b. Describe the relationship between the two data sets.

Name_____ Date _____

9.1 Practice A

Describe the relationship you would expect between the data. Explain.

1. age of the automobile and the odometer reading
2. time spent fishing and the amount of bait in the bucket
3. number of passengers in a car and the number of traffic lights on the route
4. The table shows the heights (in feet) of the waves at a beach and the numbers of surfers at the beach.

Wave Height	3	6	5	1
Number of Surfers	24	61	56	15

   a. Write the ordered pairs from the table and plot them in a coordinate plane.

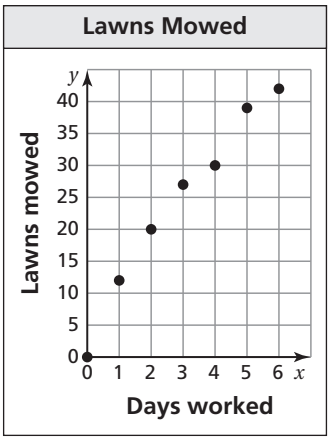
   b. Describe the relationship between the two data sets.

5. The scatter plot shows the numbers of lawns mowed by a local lawn care business during one week.

   a. How many days does it take to mow 30 lawns?

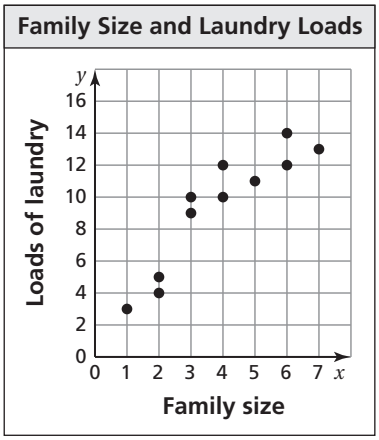
   b. About how many lawns can be mowed in 1 day?

   c. Describe the relationship shown by the data.



Describe the relationship between the data. Identify any outliers, gaps, or clusters.

6.



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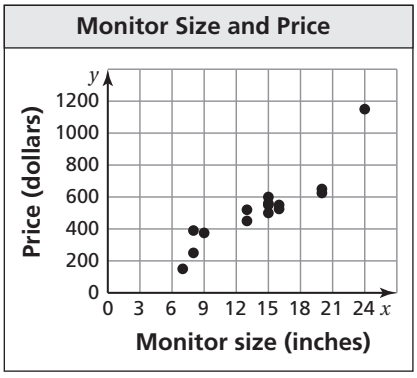


Name _____ Date _____

9.1 Practice B

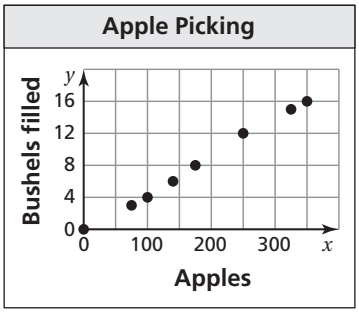
1. The table shows the numbers of students remaining on an after-school bus and the numbers of minutes since leaving the school.

Number of students	56	45	39	24	17	6	0
Minutes	0	5	9	15	23	26	32

a. Write the ordered pairs from the table and plot them in a coordinate plane.

b. Describe the relationship between the two data sets.

2. The scatter plot shows the numbers of bushels filled and the numbers of apples picked.



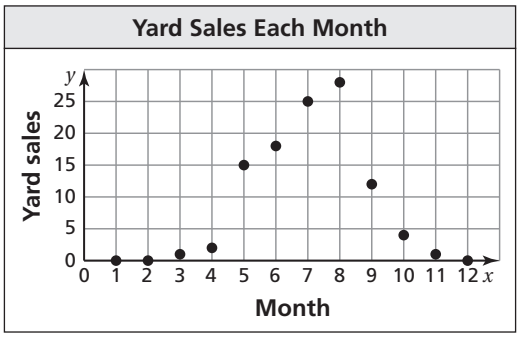
a. How many bushels are needed for 350 apples?

b. About how many apples can be placed in 8 bushels?

c. Describe the relationship shown by the data.

3. Describe a set of real-life data that has a positive linear relationship.

4. The scatter plot shows the numbers of yard sales in your neighborhood each month for a year.



a. How many yard sales are during the month of February? June?

b. During which month(s) are there no yard sales?

c. What type of relationship do the data show?

d. What type of climate might this neighborhood have?

e. Identify any outliers, gaps, or clusters and explain why they might exist.

Name_____ Date _____

9.1 Enrichment and Extension

Hands and Feet

A person's hands and feet are measured many times throughout life for items such as boots and gloves. A foot is measured from the heel to the tip of the big toe. A hand is measured from the end of the wrist to the tip of the middle finger.

1. Do you think a person's hand size and foot size are related? Make a prediction about their relationship.
2. Use a ruler to measure the length of each student's feet and hands in your class. Round the measurements to the nearest centimeter.
3. Make a scatter plot containing the data with foot length on the x-axis and hand length on the y-axis.
4. Use the data to determine if your hypothesis in Exercise 1 is correct.
5. The Guinness World Record for largest feet ever is 47 centimeters. Based on your scatter plot, about how long would this person's hands have been?
6. The record holder's hand was measured at about 32 centimeters. Is this measurement close to your prediction in Exercise 5? Explain.
7. A person's feet measure 38 centimeters. Based on your scatter plot, about how long are the person's hands?

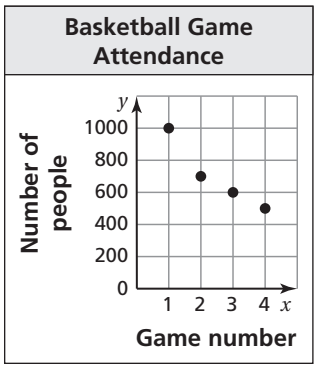
Name _____ Date _____

9.1 Puzzle Time

What Do You Call A Grouchy Person At The Beach?

Write the letter of each answer in the box containing the exercise number.

In Exercises 1–5, use the scatter plot.

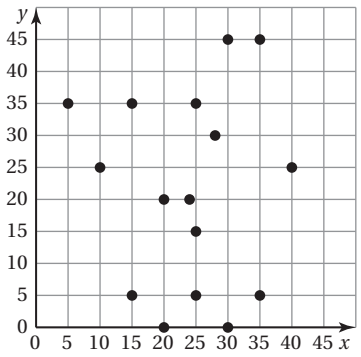


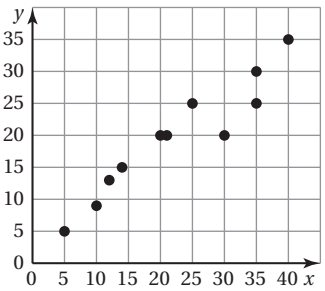
Answers

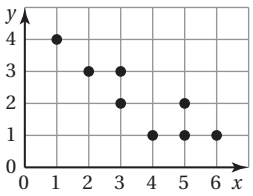
N. 700	**E.** Game 1
R. Game 2	**T.** 600
D. Game 4	**M.** Game 3
C. 500	**I.** 1000
B. positive linear relationship	
A. negative linear relationship	
S. no relationship	

1. Which game did 500 people attend?
2. How many people attended Game 2?
3. Did more people attend Game 2 or Game 3?
4. How many more people attended Game 1 than Game 4?
5. Describe the relationship shown by the data.

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

6. 

7. 

8. 

6	5	2	1	4	3	8	7

Activity 9.2 Start Thinking!

For use before Activity 9.2

Research the population of your state each year for the past several years. You can find the information at *www.census.gov*. Record the results in a table.

Graph the data. Decide which units would be best and keep in mind that you may have to round to make graphing easier.

Is the graph linear? Can you use the graph to predict the population in future years?

Activity 9.2 Warm Up

For use before Activity 9.2

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

1. $(0, 4)$ and $(5, 3)$

2. $(0, 6)$ and $(2, 0)$

3. $(8, 3)$ and $(2, 6)$

4. $(1, 2)$ and $(5, 6)$

5. $(9, 3)$ and $(3, 1)$

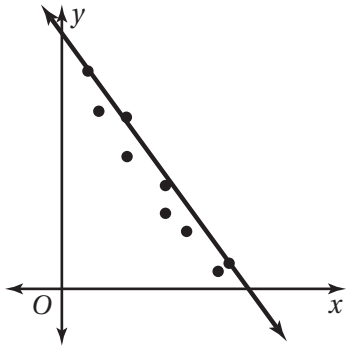
6. $(4, 16)$ and $(2, 12)$

Lesson 9.2 Start Thinking!

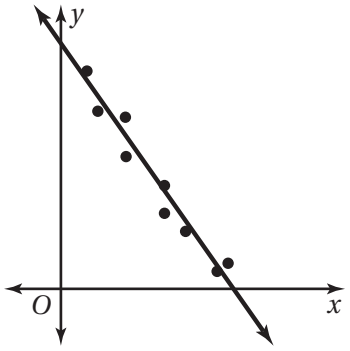
For use before Lesson 9.2

In which graph is the line shown most representative of the data? Explain.

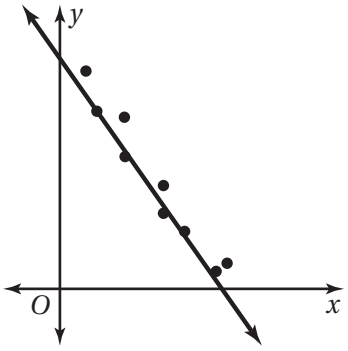
A



B



C



Lesson 9.2 Warm Up

For use before Lesson 9.2

The table shows the weight *y* of *x* bananas.

Number of Bananas, *x*	0	1	2	3	4	5
Weight (ounces), *y*	0	5	8	14	17	20

1. Graph the data in the table.

2. Draw a line that you think best approximates the points.

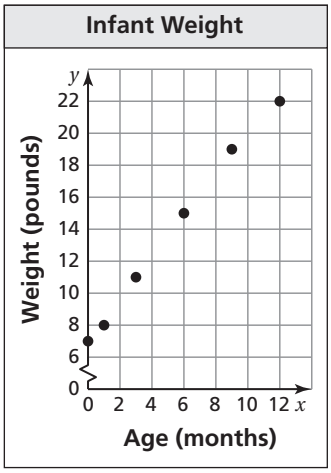
3. Write an equation for your line.

4. Use the equation to predict the weight of 10 bananas.

Name_____ Date _____

9.2 Practice A

1. The scatter plot shows the weights y of an infant from birth through x months.



a. At what age did the infant weigh 11 pounds?

b. What was the infant's weight at birth?

c. Draw a line that you think best approximates the points.

d. Write an equation for your line.

e. Use the equation to predict the weight of the infant at 18 months.

f. Does the data show a *positive*, a *negative*, or *no* relationship?

2. The table shows the numbers of losses y a gamer has x weeks after getting a new video game.

Week, x	1	2	3	4	5	6	7
Losses, y	15	12	10	7	6	3	1

a. Make a scatter plot of the data.

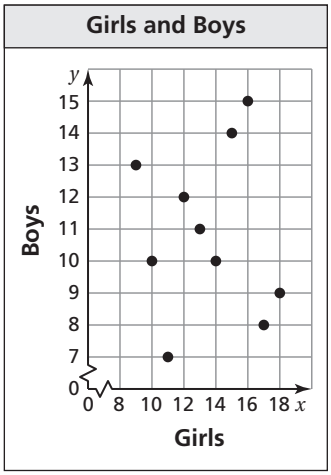
b. Draw a line of fit.

c. Write an equation of the line of fit.

d. Does the data show a *positive*, a *negative*, or *no* relationship?

e. Interpret the relationship.

3. The scatter plot shows the relationship between the numbers of girls and the numbers of boys in 10 different classrooms.



a. What type of relationship, if any, does the data show?

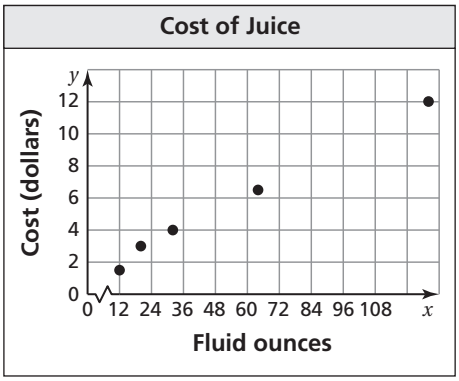
b. Is it possible to find the line of fit for the data? Explain.

c. Is it reasonable to use this scatter plot to predict the number of boys in the classroom based on the number of girls? Explain.

Name _____ Date _____

9.2 Practice B

1. The scatter plot shows the costs y of bottles containing x fluid ounces of juice.



a. How much does a gallon of juice cost?

b. How many fluid ounces of juice can you purchase for $3?

c. Draw a line that you think best approximates the points.

d. Write an equation for your line.

e. Use the equation to predict the cost of a 256-fluid ounce container of juice.

f. Does the data show a *positive*, a *negative*, or *no* relationship?

2. The table shows the mortgage interest rates y at a local bank for the years 2000 through 2008.

Year since 2000, x	0	1	2	3	4	5	6	7	8
Rate (%), y	7.6	6.8	6.2	6.0	5.2	5.8	6.1	5.9	5.5

a. Make a scatter plot of the data.

b. Draw a line of fit.

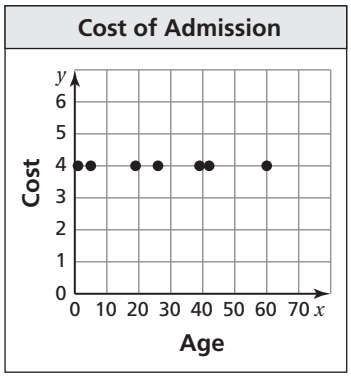
c. Write an equation of the line of fit.

d. Use the equation to predict the mortgage interest rate for the year 2010.

e. Does the data show a *positive*, a *negative*, or *no* relationship?

f. Interpret the relationship.

3. The scatter plot shows the relationship between the age of an individual x and the cost of admission y to a show.



a. What type of relationship does the data show?

b. Draw a line of fit.

c. Write an equation of the line of fit.

d. Interpret the relationship.

Name_____ Date _____

9.2 Enrichment and Extension

Correlation Coefficient

A scatter plot can reveal the relationship that exists between two sets of data. Are all relationships between data the same? Are some relationships stronger than others?

Calculate the correlation coefficient r to help determine the strength of the relationship between data. The correlation coefficient is a value between -1 and 1. When r is close to 1, the data share a strong positive relationship. When r is close to -1, the data share a strong negative relationship. If r is close to 0, the data do not share a relationship.

Analyzing the Relationship

The data in the table show the number of cubic meters x excavated during an archeological dig and the number y of artifacts found.

	x	y	xy	x^2	y^2
	1	1			
	2	3			
	3	4			
	4	5			
	5	6			
Sum	$A = 15$	$B =$	$C =$	$D =$	$F =$

1. Construct a scatter plot for the data. Draw a line of fit.
2. How many pairs of data are contained in the table? Use this number as your value for n.
3. Copy and complete the table.
4. Use the values in the table and a calculator to evaluate the formula to calculate the correlation coefficient. Round your answer to three decimal places.

$$r = \frac{n(C) - (A)(B)}{\sqrt{\left[n(D) - (A)^2\right]\left[n(F) - (B)^2\right]}}$$

5. What does the value of the correlation coefficient tell you about the relationship between the data? Does your scatter plot support your conclusion?

Name _____ Date _____

9.2 Puzzle Time

What Do Bumblebees Sing In The Shower?

Write the letter of each answer in the box containing the exercise number.

Write an equation of a line of fit for the data.

1. $(0, 10), (1, 10), (1, 25), (1, 20), (2, 30), (3, 40), (3, 50), (4, 40)$

C. $y = -10x - 10$ **D.** $y = -10x + 10$ **E.** $y = 10x + 10$

2. $(0, 14), (1, 13), (2, 9), (3, 7), (4, 5), (5, 4), (6, 3), (6, 2), (7, 1)$

B. $y = -2x + 14$ **C.** $y = 2x + 14$ **D.** $y = 2x - 14$

3. $(10, 5), (25, 20), (30, 30), (50, 35), (50, 40), (60, 50), (70, 75), (80, 60)$

C. $y = \frac{22}{25}x + 2$ **D.** $y = -\frac{22}{25}x + 2$ **E.** $y = \frac{22}{25}x - 2$

4. $(40, 120), (50, 100), (70, 100), (80, 60), (100, 60), (110, 20), (120, 20), (130, 10)$

A. $y = -\frac{5}{4}x - 170$ **B.** $y = -\frac{5}{4}x + 170$ **C.** $y = \frac{5}{4}x + 170$

Use a graphing calculator to find an equation of the line of best fit.

5. $(0, 1), (1, 1.5), (2, 2), (2, 2.5), (3, 2), (3, 3.75), (4, 3.5), (4, 4)$

O. $y = 0.70x - 0.88$ **P.** $y = 0.70x + 0.88$ **Q.** $y = -0.70x + 0.88$

6. $(0, 1), (1, 1.5), (1.5, 1.25), (2, 1.5), (3, 2), (3, 2.5), (4.5, 4), (5, 5.25)$

M. $y = -0.81x + 0.35$ **N.** $y = 0.81x - 0.35$ **O.** $y = 0.81x + 0.35$

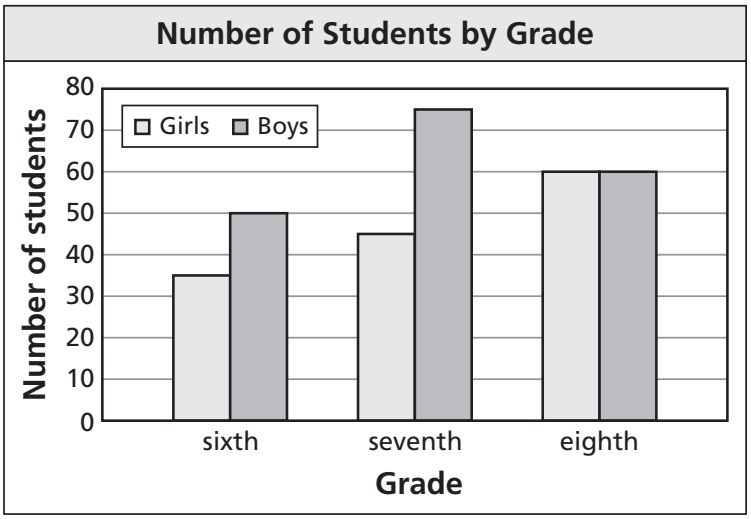
.

4	3	1	2	6	5

Activity 9.3 Start Thinking!

For use before Activity 9.3

Use the double bar graph to complete the table.



	Boys	Girls
6th grade		
7th grade		
8th grade		

Activity 9.3 Warm Up

For use before Activity 9.3

Use the table to complete the exercises.

		Been outside the U.S.?	
		Yes	No
Speak more than one language?	Yes	12	4
	No	18	12

1. How many people surveyed speak more than one language?

2. How many people surveyed have never traveled outside of the U.S.?

3. How many people only speak one language and have traveled outside of the U.S.?

Lesson 9.3 Start Thinking!

For use before Lesson 9.3

Survey your class to determine the class's two most-watched television shows. Name the two shows.

Then complete the two-way table using data from your class.

		Watch show #1	
		Yes	**No**
Watch show #2	**Yes**		
	No		

Interpret the table.

Lesson 9.3 Warm Up

For use before Lesson 9.3

You randomly survey students about country music. You display the two categories of data in the two-way table below.

		Like country music?	
		Yes	**No**
Student	**Male**	24	28
	Female	18	14

1. How many female students like country music?

2. How many male students do *not* like country music?

Name_____ Date _____

9.3 Practice A

1. The two-way table shows the results of a football team's home games over the last five seasons and whether the stadium roof was open or closed.

		Stadium Roof	
		Open	**Closed**
Result	Win	25	7
	Loss	8	0

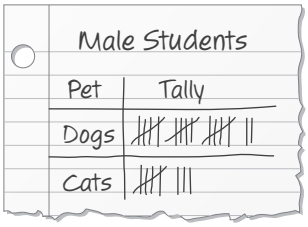
a. How many home games did the team win?

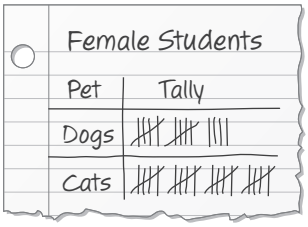
b. How many home games did the team lose with a closed roof?

c. Find and interpret the marginal frequencies.

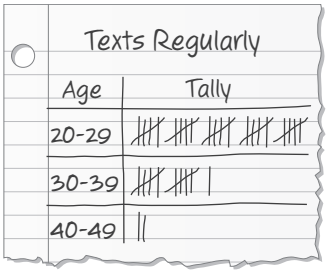
d. What percent of the total home games did the team win with an open roof?

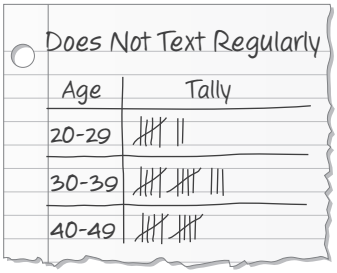
2. You randomly survey students in a school about whether they prefer cats or dogs as pets. The results are shown in the tally sheets. Make a two-way table including the totals of the rows and columns.





3. You randomly survey people in the mall about whether or not they regularly use text messaging. The results are shown in the tally sheets.





a. Make a two-way table that includes the marginal frequencies.

b. For each age group, what percent of the people in the survey text regularly? do not text regularly? Organize the results in a two-way table. Explain what one of the entries represents.

c. Does the table in part (b) show a relationship between age and texting? Explain.

Name _____ Date _____

9.3 Practice B

1. Find and interpret the marginal frequencies.

		Number of doors	
		Two	Four
Number of Cylinders	Four	54	25
	Six	37	84

2. You randomly survey students in your school. You ask whether they spend more leisure time watching television, playing video games, or going online. You display your results in the two-way table.

a. How many 11th-graders chose playing video games?

b. Find and interpret the marginal frequencies for the survey.

c. What percent of students in the survey are the 12th-graders who spend more time going online?

		Leisure Time		
		Television	Video games	Internet
Grade	10th	25	38	12
	11th	32	26	16
	12th	30	20	30

3. You randomly survey your classmates about the color of their hair. The results are shown in the tables.

a. Make a two-way table.

b. Find and interpret the marginal frequencies for the survey.

c. For each hair color, what percent of the students in the survey are female? male? Organize the results in a two-way table.

Hair Color of Female Classmates			
Red	Blonde	Brunette	Black
3	15	41	33

Hair Color of Male Classmates			
Red	Blonde	Brunette	Black
4	21	30	27

Name_____ Date _____

9.3 Enrichment and Extension

Two-Way Tables

1. Students were polled about who they are planning to vote for in a student council election. The results are shown in the two-way table.

	Owen	Claire
Boys	35	27
Girls	18	46

a. How many girls are planning to vote for Claire?

b. How many boys were polled?

c. How many students polled are planning to vote for Owen?

d. Who do you think will win the election? Explain.

2. Out of a class of 20 students, 7 own a dog but not a cat, 5 own a cat but not a dog, and 3 own both a dog and a cat.

a. Complete a two-way table for the situation.

b. How many students in the class own a dog?

c. How many students in the class own *neither* a dog *nor* a cat?

3. Two hundred people were surveyed about a book and the movie based on the book.

	Have read the book	Have not read the book
Have seen the movie	115	57
Have not seen the movie	7	?

a. Complete the two-way table for the situation.

b. How many people surveyed have seen the movie?

c. What percent of people surveyed have not read the book?

4. In a class of 25 students, there are 10 girls who play soccer and 4 boys who do not. How many boys play soccer if there are 14 girls in the class? Make a two-way table to help you answer the question.

Name _____ Date _____

9.3 Puzzle Time

What Do You Get When You Cross A Snake And A Kangaroo?

Write the letter of each answer in the box containing the exercise number.

You randomly survey students in your school about whether they have access to the Internet at home. You display the two categories of data in the two-way table.

		Internet	
		Yes	No
Grade	6th	30	6
	7th	28	3
	8th	35	7

1. How many sixth-graders have access to the Internet at home?

2. How many seventh-graders do not have access to the Internet at home?

3. How many eighth-graders have access to the Internet at home?

4. What is the marginal frequency for the number of sixth-graders surveyed?

5. What is the marginal frequency for the number of seventh-graders surveyed?

6. What is the marginal frequency for the number of eighth-graders surveyed?

7. What is the marginal frequency for the number of students surveyed who have access to the Internet at home?

8. What is the marginal frequency for the number of students surveyed who do not have access to the Internet at home?

Answers

U. 6

M. 3

P. 42

T. 28

R. 93

O. 30

J. 16

P. 31

U. 36

E. 35

D. 7

8	4	2	6		7	1	5	3

Activity 9.4 Start Thinking!

For use before Activity 9.4

List all of the different ways you know to display data.

Which can be used to display a list of values?

Which can be used to display information divided into categories?

Which can be used to display the relationship between two sets of data?

Activity 9.4 Warm Up

For use before Activity 9.4

Make a circle graph of the data.

1. A middle school has 390 sixth-graders, 310 seventh-graders, and 300 eighth-graders.

2. The results of a survey in which 20 people were asked to name their favorite color are shown in the table.

Color	blue	red	green	pink	other
People	7	4	3	2	4

Lesson 9.4 Start Thinking!

For use before Lesson 9.4

How are a bar graph and a histogram similar? How are they different?

How are a line graph and a dot plot similar? How are they different?

How are a stem-and-leaf plot and box-and-whisker plot similar? How are they different?

Lesson 9.4 Warm Up

For use before Lesson 9.4

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

Student's Quiz Scores						
Quiz	1	2	3	4	5	6
Grade	82	77	91	88	100	84

Name_____ Date _____

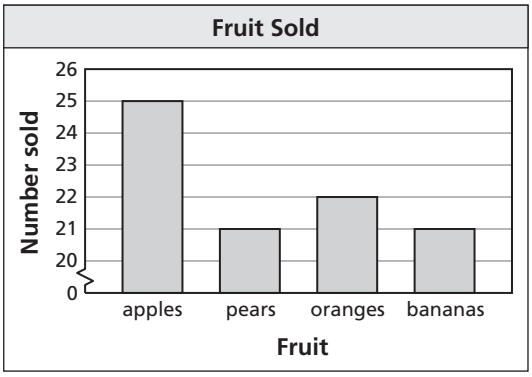
9.4 Practice A

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

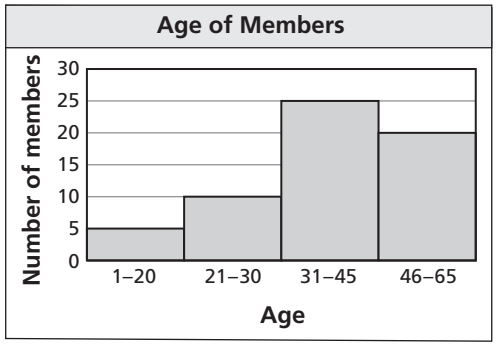
1. the price of a stock over the last 5 years
2. the numbers of breads, rolls, muffins, and cookies baked this week
3. the number of runners in each 10-year age bracket
4. the comparison of city population and the number of fire stations

Explain why the data set is misleading.

5.



6.



7. An EMT wants to use a data display to show students the relationship between the speed of the vehicle and the number of accidents. Choose an appropriate data display for the situation. Explain your reasoning.
8. What type of data display is appropriate for showing the averages of data over a period of time?
9. The home insurance industry wants to use a data display to show the variability in the costs of insurance for a $200,000 home. Choose an appropriate data display for the situation. Explain your reasoning.
10. A nutritionist wants to use a data display to show kindergarteners the recommended amounts of fruits, vegetables, breads, meats, and dairy that should be consumed each day. Choose an appropriate data display for the situation. Explain your reasoning.
11. The Smithsonian has been collecting data over the last 60 days. They want to use a data display to both put the data in order and to display how the data is distributed. Choose an appropriate data display for the situation. Explain your reasoning.

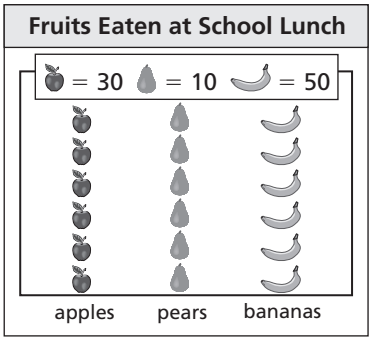
Name _____ Date _____

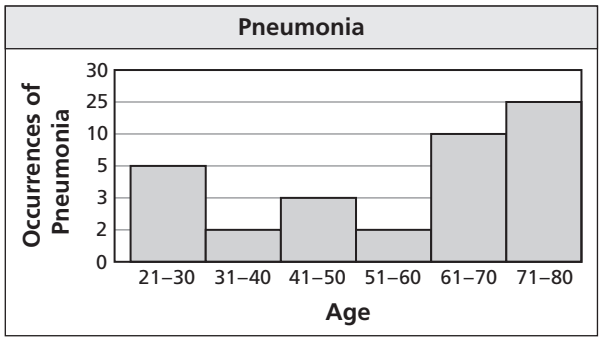
9.4 Practice B

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

1. the heights of girls in grades 6 through 12
2. the numbers of computers offered within $100 price ranges
3. the comparison of the number of students and the number of office staff
4. the percentages of income budgeted for food, utilities, housing, gas, and education

Explain why the data set is misleading.

5. 

6. 

7. You spin a spinner 20 times and want to use a data display to show the number of times each of the numbers 1 through 5 occurs. Choose an appropriate data display for the situation. Explain your reasoning.
8. What type of data display is appropriate for showing the median of the data values?
9. A professor wants to use a data display to show the relationship between class sizes and passing rates for college students. Choose an appropriate data display for the situation. Explain your reasoning.
10. A dentist wants to use a data display to show the percentages of clients using different types of toothbrushes. Choose an appropriate data display for the situation. Explain your reasoning.
11. The new executive was making a presentation to the Board of Directors. He used a pictograph to show the weekly profits made by his department during the last 3 months.
    a. Explain why this would be an inappropriate use of a data display.
    b. Choose an appropriate data display for his situation.

Name_____ Date _____

9.4 Enrichment and Extension

Misleading Statistics

When someone quotes a statistic and says, "The average number of …," the word "average" can refer to any of the measures of center, not necessarily the mean of the data.

1. The graph shows the hourly wages of 10 employees in a company. Find the mean, median, and mode of the data set.

2. The company advertises that the average pay rate for its employees is $15 per hour.

a. Which measure of center is the company using?

b. Why do you think the company used this measure of center?

3. A competitor claims that the average pay rate is only $12 per hour, and a newspaper reports that the average pay rate is $13.50 per hour.

a. Which measure of center is each one using?

b. Why do you think each one chose the measure of center that was used?

4. Which measure of center best represents the data set?

5. The company has 100 employees. The sample used to gather data was the 10 employees who had been working at the company the longest. Is the sample a good representation of the population as a whole? Explain.

Name _____ Date _____

9.4 Puzzle Time

What Do You Call A Boomerang That Doesn't Come Back?

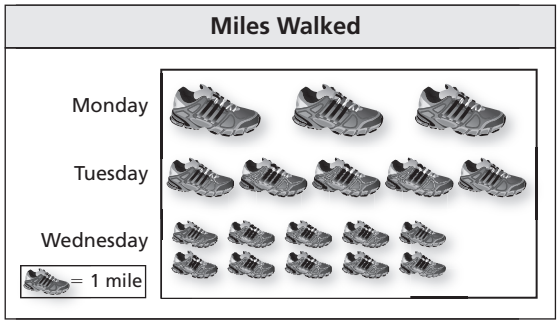
Write the letter of each answer in the box containing the exercise number.

Choose an appropriate display for the situation.

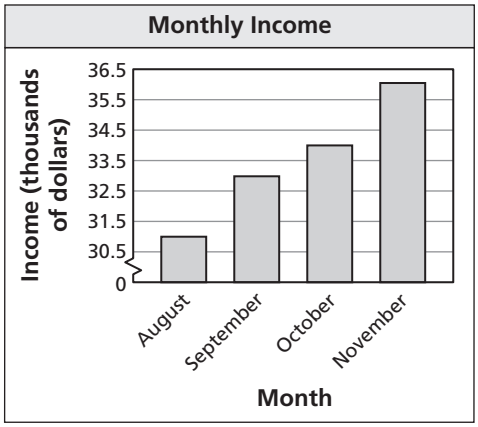
1. the outcomes of rolling a number cube with sides labeled 1, 2, 3, and 4
2. the percent of votes that each soda received during a taste testing contest
3. the number of students on the cross country team each year

Explain why the data display is misleading.

4.



5.



Answers

T. line graph

K. circle graph

I. The break in the vertical axis makes the differences appear to be greater.

S. Pictures are of different sizes.

C. dot plot

4	3	5	1	2

Name_____ Date _____

Chapter 9

Technology Connection

For use after Section 9.2

Linear Regression, Interpolation, and Extrapolation

In the Chapter 6 Technology Connection, you learned how to use a spreadsheet to display scatter plots. By including a few additional formulas in your spreadsheet, you can find the line of best fit for the data. With this line, you can then predict a value outside the data range (*extrapolation*) or a value within the data range that was not measured (*interpolation*).

EXAMPLE Use a spreadsheet to find the line of best fit for the data and then predict the values of y when $x = 3$ and $x = 12$.

$(-3, 10), (-1, 7), (1, 4), (2, 1),$
$(4, -2), (6, -5), (7, -5), (9, -8)$

SOLUTION

Step 1 In a spreadsheet, starting in cells A1 and B1, enter the values of x in column A and the values of y in column B.

Step 2 To find the line of best fit, you need to find the slope and y-intercept that best describes the data. To find the slope, in cell C1 enter the formula =SLOPE(B1:B8, A1:A8) and then press Enter. The cell should display –1.5331.

Step 3 To find the y-intercept, in cell D1 enter the formula =INTERCEPT(B1:B8, A1:A8). The cell should display 5.041. So, the line of best fit is $y = -1.5331x + 5.041$.

Step 4 Substitute the x-values of 3 and 12 into the equation to interpolate the point (3, 0.4417) and extrapolate the point (12, –13.3562).

In Exercises 1–3, use a spreadsheet.

The chart below shows the number of points y scored in a basketball after x minutes.

Minutes, *x*	2	5	12	18	20	24	26
Points, *y*	2	6	8	12	16	18	20

1. What is the line of best fit for the data?

2. How many points would you expect after 14 minutes?

3. How many points would you expect after 30 minutes?